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BY

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ABSTRACTS

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INTRODUCTION

THE modern study of Geography has been welcomed by education-
alists ; but each, from his own point of view, looks upon it as the
handmaid of his own particular hobby. Historians, Geologists,
Botanists, Meteorologists, and even Philologists not only accept its
help, but are anxious to subordinate it to their own sciences ; while
the parent rejoices that at last the unpractical schoolmaster is actually
teaching something useful, wherein he refers to either commercial
or political geography. It may be possible for the geographical
specialist to satisfy the requirements of all these educational experts ;
but the ordinary boy, desiring a good general education, can only be
expected to attain to a fair knowledge of the principles involved,
with some power of applying them to the countries which are of most
importance to him.

These Notes are divided into three parts, as far as possible
mutually independent, so that they may be taken as a three-term
course. Using the British Empire as a political base, they introduce
the various geographical causes and effects in connection with that
part of the Empire in which each is most conspicuous, *e.g.* monsoons
in India. There is a short index at the end.

Each boy should have a good physical atlas, and the teacher a
physical map on which he can show railways, boundaries, products,
etc., as he refers to them. Lantern-slides are invaluable.

Much that might be included has been omitted—perhaps this is
the chief merit of the Notes. Geography is apt to lose much of its
interest when information is set out at full length in a book ; here an
attempt is made to set out, in an abbreviated form, only the most
striking characteristics. To arouse real interest, it is essential that

a teacher should have opportunity for digression into more specialised branches of the subject which are of interest to him personally ; it is hoped that the Notes may be useful as a basis for his lectures or discussions, and at the same time obviate the necessity of much dictation.

Amongst those who have looked through proofs and made valuable suggestions, I have especially to thank Dr. H. N. Dickson, University College, Reading, and Mr. W. L. Bunting, R.N.C., Osborne.

J. C. C.

The following books are recommended to those who wish for a fuller treatment of any part of the subject :—

LYDE's *Commercial Geography of the British Empire* (2/-), dealing with climate and products.

MEIKLEJOHN's *British Empire* (3/-), especially good for trade.

STANFORD's *Compendium of Geography and Travel*.

MILL's *International Geography* (12/-, also issued in parts) and CHISHOLM's *Commercial Geography* (15/-) cover most of the ground.

MACKINDER's *Britain and British Seas* (7/6), a most inspiring treatise on British Isles.

HERBERTSON's *Junior Geography* (2/-), treated from the point of view of physical geography.

AVEBURY's *Scenery of England* (6/-) and GEIKIE's *Scenery and Geology of Scotland* (10/-), mainly geological.

TAYLOR's *Australia* (3/6).

UNSTEAD AND TAYLOR's *General and Regional Geography* (6/-), an admirable treatise on physical geography.

The Statesman's Year-Book (10/6) provides many statistics.

Encyclopædia Britannica is most useful for reference.

CANADA AND SOUTH AFRICA

CANADA

References are to pages in Herbertson's Descriptive Geography of the British Empire.

CANADA is the northern continuation of U.S.A., of which Eastern States belonged to England till A.D. 1776.

The boundary between the countries is largely artificial—irregular on the South of New Brunswick and Quebec—along the St. Lawrence through the Great Lakes to the Lake of the Woods—along Lat. 49° N. to the Pacific, through lands which have only been settled within the last 30 years.

	Area.	Population.	Density per sq. mile.
Canada . .	3,750,000	6,200,000	1·7
Australia .	3,000,000	4,300,000	1·4
India . .	1,760,000	300,000,000	171
British Isles .	121,000	45,000,000	372
U.S.A. . .	3,000,000	84,000,0000	28

Thus Canada is rather bigger and more populous than Australia—a large part of it (the cold North) is almost useless—being a “new” country, it relies mainly on agriculture, lumber, and some valuable minerals—manufactures are little developed—centres of population are on the main lines of communication, especially where water transport is exchanged for land transport.

Physical features and characteristics of U.S.A. and Canada are similar.

Ridges of mountains parallel to East and West coasts.

Great Central Plain between them, rising towards the West.

- (1) Parallel to West Coast—a series of ridges, the valleys being occupied by rivers which break “across the grain” to the Pacific.
Rocky Mountains (roughly 5,000 to 10,000 ft.) about 500 miles inland.

Cascade Mountains near the coast.

10 GEOGRAPHY NOTES

Vancouver Island, Queen Charlotte Island, etc., which are the summits of a submerged ridge.

In valleys, chief rivers are Fraser and Columbia with tributaries, *e.g.* Kootenay.

- (2) Parallel to East Coast—older and lower ridges.
Appalachian Highlands extend to Gulf of St. Lawrence.
Ridges of Nova Scotia and Newfoundland.
Lower part of R. St. Lawrence is parallel to grain.
- (3) Laurentian Plateau, composed of very hard and ancient rocks—only fertile in depressions which are filled with clay deposit or in river valleys—occupies the V-shaped region between Hudson Bay and the Lakes, including Labrador Peninsula and Height of Land.
- (4) The Great Plains, rising towards the Rockies by three great terraces (800 ft., 1,600 ft., 3,200 ft.)—covered with fertile soil—a vast ice-sheet once radiated to the South and West from Greenland and the Hudson Bay region; on its retirement, it left the ring of Lakes from Lake Ontario to Great Bear Lake, and an invaluable layer of glacial deposit (*cp.* Norfolk) on the prairies.

Winds and rainfall—general principles, applicable to whole world.

(I) Air expands when heated, and spreads out so as to occupy more space.

∴ hot air is lighter than cold air.

∴ when hot and cold air are near each other on the earth's surface, there will be a tendency for the heavier cold air to occupy a layer of atmosphere below the lighter warm air; in seeking this state of equilibrium, cold air must flow into the position originally occupied by warm air,—*i. e.* a surface wind blows from the colder place to the warmer.

e.g. Air near the Equator is generally warmer than air more remote.

∴ air flows towards the Equator from places North and South of it.

(II) Consider the Northern Hemisphere. In the daily eastward rotation of the earth, places further from the Equator are nearer to the earth's axis, and therefore revolve through smaller circles than places nearer to the Equator.

∴ they move at a slower pace eastwards.

∴ when air belonging to Lat. 30° N., which has been moving eastward at a pace suitable at that latitude, moves towards the Equator according to Law I, it finds the ground there moving eastward at a greater pace,

i. e. to a man standing on the ground, this invading air (by reason of its slower eastward velocity) will appear to have a westward velocity, as well as its southward velocity,

i. e. he will call it a N.E. wind.

This is the *N.E. Trade Wind*.

(Similar reasoning will show that, in the Northern Hemisphere, all winds are turned "right-handed" by the rotation of the earth, *e. g.* a South wind becomes a S.W. wind).

(Ferrel's Law: "All air-currents, owing to the earth's rotation, swerve right-handed in Northern Hemisphere, left-handed in Southern.")

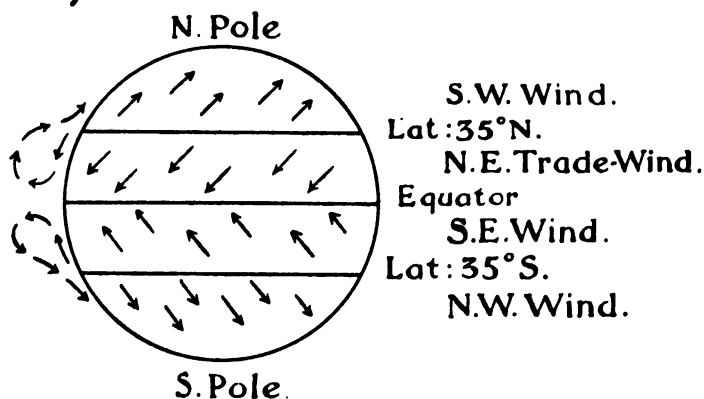


Diagram to show prevailing winds.

(III) Besides this movement of air towards the Equator, there is a movement towards the Pole, which is prevalent North of Lat. 35° : this wind is turned right-handed by the rotation of the earth, and becomes a *S.W. wind*.

The existence of this wind may be partially explained as in the diagram; the air of the trade wind rises at the Equator, and returns in the upper atmosphere towards the Pole: it descends into the lower atmosphere about Lat. 35° , with a velocity towards the Pole.

Cyclones are characteristic of the Westerlies area; *i.e.* eddies in the atmosphere, drifting Westwards.

(IV) A similar treatment of the Southern Hemisphere will show that the winds are turned left-handed by the rotation of the earth; and we find the Trade wind is S.E., and the return current is N.W.

The following general scheme, then, applies roughly to the whole World, though modified by local causes.

Northern Hemisphere.

North of Lat. 35° N. "Westerlies" (S.W. wind). *e.g.* British Isles, Canada.

South of Lat. 35° N. N.E. "Trade wind." *e.g.* India, Jamaica.

Southern Hemisphere.

North of Lat. 35° S. S.E. "Trade wind." *e.g.* Natal, S. Queensland.

South of Lat. 35° S. "Westerlies" (N.W. wind). *e.g.* Tasmania, New Zealand.

The general principles of *rainfall* are shown in diagram.

- (1) Heat (or wind) causes evaporation of moisture from the sea.
- (2) If the wind blows landwards, and meets rising ground, the air is forced into higher altitudes.
- (3) But, in higher altitudes,
 - (a) temperature is lower,

(b) air is under less pressure, and \therefore expands, and this lowers its temperature.

\therefore for both these reasons, the in-blowing air is cooled.

(4) But air when cooled is less capable of holding moisture in the form of vapour.

\therefore this moisture condenses—first into cloud, then into rain.

(A similar result follows if a wind blows from a warm sea to any colder place.)



Diagram to show theory of rainfall

(5) On the leeward side of the mountains, the process is reversed—the air descends, is compressed and warmed, and is less likely to part with its moisture (*e.g.* Chinook wind).

Hence, as a rule, winds blowing towards a land are likely to cause rain if there is rising ground, or if the land has a lower temperature than the sea. Cp. W. Canada, W. Scotland, E. Australia.

Climate.—Canada lies between Lat. 42° and 72° N.

\therefore in the “Westerlies” area.

\therefore prevailing wind is S.W., which brings moisture from Pacific Ocean to W. Coast; it also brings a warm current (N. Pacific Drift, cp. N. Atlantic Drift) to W. Coast, whereas on E. Coast the cold Labrador current, flowing from Arctic Ocean, has much less effect on land-temperature because the prevailing wind blows off-shore.

(A) West of the Rockies.

Climate similar to England—"maritime" (*i. e.* no extremes of heat or cold)—warm and moist—protected from cold winds by the Cordilleras—plentiful rainfall on western slopes, brought by S.W. wind.

(B) Eastern Half.

Climate moderated by Atlantic Ocean, Hudson Bay, Great Lakes—but, since prevailing wind blows towards the sea, it is less "maritime" than the West, and has less (though sufficient) rainfall.

(C) The Great Plains, cut off from influence of oceans.

Continental climate, *i. e.* great contrast between winter and summer temperature; hot summer with warm S. wind; cold winter with deep snow, being exposed to cold N. winds—rainfall is small, decreasing towards the West ∴ Cordilleras cut off all moisture which might come from Pacific.

(D) The North is always cold.

General characteristics—mostly typical of a "new country."

Tundras (*D. 1*) in North, where too cold for much vegetation—lichen, moss—musk ox, reindeer, polar bear—a few Eskimos and fur traders.

Forests (*D. 18*) begin where rain and warmth are sufficient, *i. e.* about Lat. 62° N.; but rainfall is insufficient in South of Alberta and Saskatchewan—mainly conifers (*e. g.* larch and spruce) esp. in North and West—deciduous trees in East (*e. g.* oak, sugar-maple).

Fur-bearing animals in North, hunted by Indians—moose, caribou, bear, fox—Hudson's Bay Company founded in 1670 for fur trade.

Lumber trade (*D. 25*) is extremely important where there are facilities—timber can be carried by sleighs on winter snow, or floated down rivers (esp. when swollen in spring)—saw-mills driven by water power, *e. g.* at Ottawa, Vancouver—

wood pulp is now much used to make paper ; spruce bark is good for tanning leather.

Prairies—"The Great North-West"—a belt of land running N.W. and S.E., including Winnipeg, Regina, Edmonton, part of Peace R.—grass-lands, nearly flat, with fertile glacial deposit—excellent for wheat, which can tolerate winter cold and ripens in the long sunny days in summer.

Plains—between the Prairies and Rockies—treeless grass-lands, too dry for wheat unless irrigated—grass becomes standing hay under the hot sun—huge ranches for horses, sheep, cattle—Chinook wind melts snow sufficiently for animals to get grass even in winter.

St. Lawrence valley—originally forest land—much is now cleared and used for farming (*D.* 31)—dairy produce (esp. cheese); cereals (wheat, oats esp. in wetter East); fruits (apples, peaches, etc.).

Minerals are chiefly found in mountainous districts, where strata have been disturbed.

Coal in 3 most useful places ; *i.e.* near chief port on E. and W., and near C.P.R. pass over Rockies (main coal-supply in U.S.A. is among Appalachian Mountains—none on W. coast).

Gold in Cordilleras, esp. on Yukon R. ; also Kootenay R. Nickel (half of world's supply) on North of L. Huron (near edge of plateau).

Some copper and silver on N. of L. Huron and in Cordilleras.

Fisheries (value £5,000,000 in 1907, and £2,000,000 for Newfoundland)—cod, lobster, herring off Maritime Provinces ; salmon in Western rivers.

The *History of development* of Canada has 2 main phases, depending upon its communications.

- (1) Early settlement in East, near coast and in St. Lawrence basin—colonists came by sea from Europe, and settled on lands which they could reach by ship. Canada was

captured from France in Seven Years' War—population of Quebec province is still mainly French. Much of the land, cleared of forest, is divided into small fields for mixed farming.

- (2) Immigrants pushed westward, and Canadian Pacific Railway across the continent was opened in 1885—now various branch lines make it possible for farmers of the North-West to dispose of their crops ; but more lines are needed to open up more country—the railway has to precede cultivation—Grand Trunk Pacific will soon develop a belt North of C.P.R.—Farms are very large.

Communications.

- (a) By water—exceptionally favourable.

R. St. Lawrence strings together L. Superior (=Ireland—31,000 sq. miles), (Sault St. Marie or “Soo” canal, which has more traffic than Suez canal), L. Huron, L. Erie, (Welland canal, which avoids Niagara Falls, D. 48), L. Ontario—navigable for ocean steamers up to Montreal, where it is joined by R. Ottawa—very important connection by Erie canal and R. Mohawk with R. Hudson and New York—faces Europe, so that wheat can be brought by water from Port Arthur to England—but blocked by ice for 4 months.

L. Winnipeg, fed by Red R., Assiniboine, and Saskatchewan R.—unfortunately has its outlet (Nelson R.) to Hudson B. obstructed by rapids.

R. Mackenzie also drains several lakes, but is of little use because it flows into Arctic Ocean.

- (b) Roads are poor ; but the hard snow makes winter travelling easy—social functions are held in winter when agriculture is impossible and travelling is simplified.
- (c) Railways—of great importance in opening up the country by connecting interior with ports—expanding rapidly—uniform

gauge—companies are variously inter-related, and fostered by the State—chief obstacles are Rocky Mountains and L. Winnipeg. [Portions in square brackets are being constructed.]

- (1) Canadian Pacific Railway main line connects East and West coasts—St. John (used by C.P.R. steamers in winter), Montreal (port of C.P.R. steamers to Liverpool), Ottawa, Pt. Arthur, Winnipeg, Regina, Medicine Hat, Calgary, Kicking Horse Pass (5,300 feet), Fraser R., Vancouver (C.P.R. steamers to Yokohama, Shanghai, Hongkong).
 - Branches: Montreal to Quebec, and to Windsor (Lake Peninsula).
 - Winnipeg and Regina to Edmonton (wheat transport).
 - Calgary to Edmonton (ranches) and Crow's Nest Pass (coal).
 - Medicine Hat to Kootenay district (gold, silver, fruit) *vid* Crow's Nest Pass (4,400 feet).
- (2) Grand Trunk Pacific Ry. main line will soon reach across the continent; Halifax (important esp. in winter)—Moncton [—Quebec—] Winnipeg—Edmonton [—Yellow Head Pass (3,700 feet)—Prince Rupert]. This will also open up lands North of C.P.R. on Laurentian plateau and in North-West; it has a lower pass over Rockies than C.P.R.
- (3) Grand Trunk Ry. serves the Lake Peninsula; connects Toronto with (a) Chicago, (b) L. Nipissing, (c) Montreal and Portland (Maine).
- (4) Canadian Northern Ry. serves much of the North-West, between L. of the Woods and Edmonton—centre at Winnipeg—branch along West of L. Winnipeg [to Hudson B.].

Ports are very important, as in most "new" countries, for the export of grain and raw materials, and import of manufactured goods.

- (1) Most eastern ports are blocked by ice in winter (contrast W. coasts of Europe and Canada, which are warmed by prevailing wind and current).

Halifax—a good fortified harbour—always free from ice—supplied with coal from Pictou—railway communications, but remote from centre of Canada—much used when ice blocks the St. Lawrence.

St. John is handicapped by the high tides of B. of Fundy—used by C.P.R. in winter.

Montreal—can now be reached by ocean steamers since dredging operations, and has therefore supplanted Quebec as chief port—tranships produce from smaller ships which navigate Upper St. Lawrence and R. Ottawa—railways from Winnipeg, Lake Peninsula, and Maritime States and New England (by bridge)—very busy, but blocked by ice for 4 months.

Lake ports—Toronto, Hamilton, Port Arthur (grain).

Port Churchill on Hudson Bay would provide shortest route from Winnipeg to England—but navigation is only open for at most 4 months (1 after harvest), and the railway is not yet built.

- (2) Western ports are kept open by warm winds and current—trade on the Pacific with Japan, China, Australia, etc., is increasing fast.

Vancouver (not on Vancouver I.)—developed as terminus of C.P.R.—increasing in importance as chief outlet to the West—coal from Vancouver I.

Esquimalt—port of Vancouver I.—fine natural harbour.

Port Simpson will be very important when the new railways are built.

The Dominion of Canada consists of 9 Provinces; also 4

Territories whose population is too sparse for the organisation of a Province—it is ruled by a Governor-General and Privy Council, with 2 Legislative Assemblies—each Province has its own Assemblies, etc.—(Newfoundland prefers to stay outside the Dominion, with its own Governor and Legislative Assemblies).

[**Newfoundland**—agriculture is little developed—mountainous, with excellent harbours (cp. Norway)—chiefly occupied in sealing and fishing (greatest cod-fishery in the world), esp. on the Grand Banks, where fish find good food in shallow sea—liable to fogs where cold Labrador current approaches the warm Gulf Stream—“Daily Mail” owns forests whose wood-pulp is used for its paper.]

Nova Scotia owes its shape to the “grain” of the rocks—includes C. Breton I., where Sydney (a good port) uses local coal to smelt iron from Newfoundland—nearly cut off by B. of Fundý, whose shape causes the highest tides in the world—good harbours—mainly fishing (cod and lobster)—chief Canadian coalfield in the North near Pictou—Halifax (capital) is chief ice-free port and coaling station in E. Canada—best apples in Vale of Annapolis.

Prince Edward Island—about size of Norfolk—fertile red-sandstone soil, good for mixed farming (potatoes, oats, dairy produce)—fishing in G. of St. Lawrence (lobsters).

New Brunswick—natural forests of spruce (important lumber trade—agriculture flourishes in the few clearings—St. John (on St. John R.) is good harbour, but awkward owing to great range of tide.

Quebec extends over 3 types of land—

- (1) wooded highlands, of Appalachian system, South of St. Lawrence;
- (2) highlands of ancient Laurentian plateau, North of St. Lawrence—forests wherever soil is sufficient (*e.g.* in river valleys, or basins of clay); lumber trade very important, esp. for wood pulp—some agriculture in clearings;
- (3) plain of St. Lawrence—a narrow strip between these highlands—fertile and thickly populated—mainly agriculture

(oats) and dairy farming, suited to a moist climate; also fruits (apples, etc.).

Quebec (capital) is a finely-placed fortress, on the high tongue of land between Charles R. and St. Lawrence—its capture by Wolfe in 1759 led to the easy conquest of the rest of Canada—considerable lumber trade; also leather industries (hides of cattle tanned by bark of spruce-fir)—much of the shipping now passes up the river to Montreal.

Montreal—biggest town in Canada (400,000 in 1907); majority still speak French—on an island—chief commercial focus (esp. grain traffic) at head of ocean navigation and beginning of inland waterways (St. Lawrence and Ottawa R.); railways in all directions (lowest bridge over St. Lawrence)—increasing manufactures (flour mills, iron foundries, etc.).

Ontario (*D. 33*)—settled by loyalists who left U.S.A. after War of Independence—climate somewhat moderated by Great Lakes—has 2 types of land like Quebec.

- (1) Laurentian plateau—lumber trade—slopes down to swamps near Hudson B.—some minerals (nickel, copper) where plateau breaks off into plain, *e.g.* near Sudbury.
- (2) Laurentian plain—widens in S.W. into Lake Peninsula (between Georgian B., L. Huron, and L. Erie), which is the richest and most populous district in Canada (climate exceptionally mild—soil fertile—mixed farming; wheat, oats, dairying—fruits, *e.g.* apples, pears, peaches, plums, grapes)—some fishing in lakes.

Ottawa—capital of Dominion since 1867, on C.P.R. main line—on R. Ottawa near Chaudière Falls, which provide water power for its great lumber mills—its importance is mainly political (pop. 60,000).

Toronto (pop. 325,000)—capital of Ontario—second to Montreal commercially—a great Lake port (on L. Ontario) with growing manufactures, *e.g.* agricultural implements.

Hamilton—port on L. Ontario, with steel manufactures—much trade from Lake Peninsula.

Manitoba—most famous for its wheat, which grows best on the fertile deposits in basin of Red River, L. Manitoba, and L. Winnipeg; also on open prairies which extend westward (as opposed to forest lands of the East)—more extreme climate.

Winnipeg (capital of Manitoba—*D.* 52) is focus of whole district—nearly in centre of Canada, a meeting-place of its great industries (agriculture, pasture, lumber, fur)—merely a fort in 1870; 120,000 pop. in 1908—great railway junction on C.P.R. main line—good waterways; Red R., Assiniboine R., L. Winnipeg, R. Saskatchewan, Winnipeg R., L. of the Woods—thus collects most of the prairie produce of the North-West.

Saskatchewan—soil good, climate more extreme—vast wheat-fields (*D.* 35) flourish wherever rail or water communication enables crops to be disposed of; fresh prairie land is ploughed as soon as a fresh railway is built—also cattle on natural grass-lands.

Regina (capital)—a small town at railway junction on C.P.R.—headquarters of North-West Mounted Police, who preserve order in all the North-West.

Alberta—drier climate, but warmer owing to S.W. Chinook winds (see p. 11, § 5)—wheat flourishes in North, up to Peace R., where the long, sunny, summer days enable it to ripen—ranching (horses, cattle, sheep—*D.* 36) in South, where grass dries into standing hay, and there is little winter snow—forests on mountain slopes.

Edmonton (capital) and Calgary (on C.P.R. main line) are local centres.

British Columbia (*D.* 61)—climate on coast similar to England, having similar conditions, *e. g.* S.W. wind blowing off warm ocean—mainly mountainous, with fine forests (*esp.* Douglas-fir) on slopes; lumber trade important; saw-mills in coastal towns, *e. g.* Vancouver, to which logs float down rivers; some gigantic trees over 300 ft.; visited by sportsmen, who shoot bears, etc.—much fishing, *esp.*

salmon, which are tinned and exported (esp. Fraser R.)—farming in wider valleys ; fruit cultivation is increasing fast (pears, apples, etc.)—mining has a great future, *e.g.* coal in Vancouver I., Crow's Nest Pass ; gold on Fraser R. and near Columbia R. (Kootenay district)—importance of the province will increase when China, Japan, etc., develop further.

Vancouver (town on mainland) is important as terminus of C.P.R. and chief Canadian port on Pacific.

Victoria (capital) on Vancouver I.—Esquimalt is its port.

The rest of Canada, divided into Territories, is of much less importance—very sparse population ; mainly native Indians and fur-raders—but Yukon is the chief gold district in Canada (£1,000,000, annually), round Dawson, where R. Klondyke joins R. Yukon (railway to sea coast).

WEST INDIES

Jamaica (*D.* 221)—our largest island in West Indies—double the size of Northumberland—valuable to us for its tropical products; *e. g.* sugar-cane (declining since advance of beet-sugar), coffee, bananas—liable to earthquakes, and severe cyclones—Kingston (capital) is a good harbour, and will gain much importance when Panama canal is opened.

Our other possessions within or near the Tropics have similar products—

Bahamas—coral islands—tropical fruits; sponges—cabinet woods (mahogany).

Barbados—sugar.

Windward Isles (*e. g.* Grenada)—cocoa, cotton, spices.

Leeward Isles (*e. g.* Dominica)—sugar (molasses).

Trinidad—famous for its lake of pitch (*D.* 227).

British Guiana (in S. America)—sugar (rum, molasses).

British Honduras (in Central America)—tropical forests (mahogany, etc.).

Bermudas—half-way between Halifax and Jamaica—useful naval station.

Falkland Isles—in extreme South—a few sheep.

THE UNION OF SOUTH AFRICA

In 1910 the first Parliament of the Union was opened by Duke of Connaught, representing King George—a self-governing federation of four States, with two legislative assemblies ; executive is in hands of Governor-General advised by a Council of ten members.

Cape of Good Hope—visited by Portuguese in 1487—occupied by Dutch c. 1652—became British in 1815, after war against France and her ally Holland.

Natal—occupied by discontented Boers who trekked from Cape Colony c. 1836—annexed to Cape Colony by British in 1843—later, it became a separate British Colony.

Orange Free State—occupied by Boers at same time as Natal—annexed by British ; but independence restored in 1854—again annexed by British as result of Boer War in 1902.

Transvaal—occupied by discontented Boers who trekked from Cape Colony c. 1836 and Natal c. 1848—annexed to Cape Colony at their own request in 1877, for protection against Zulus—revolted under Kruger in 1880, and secured independence by victories, *e. g.* Majuba Hill—again annexed by British as result of Boer War in 1902.

Native population, usually called Kaffirs, belong mainly to Bantu stock—a negroid race of fine physique, esp. Zulus ; other Bantus are Basutos, Swazis, etc.—there are also remnants of inferior races, *e. g.* Hottentots in N.W. Cape Colony, Bushmen near Kalahari Desert.

Of the Whites, Boers predominate as farmers in Transvaal and Orange Free State ; English predominate in East, and in mining towns.

	Area in sq. miles.	Population.	Proportion of Whites in total population.
Cape of Good Hope	277,000	2,500,000	'25
Natal	35,000	1,000,000	'09
Orange Free State	50,000	250,000	'35
Transvaal	111,000	1,000,000	'2
Protectorates, etc.			
Basutoland	10,000	350,000	'003
Swaziland	6,000	85,000	'01
Bechuanaland	275,000	130,000	'008
Rhodesia	440,000	1,500,000	'01

Cape Colony is about five times the size of England, Rhodesia eight times. Total population about equal to London.

Physical features.

The interior is a rolling plateau, usually called the Veld, about 5,000 ft. above sea level—dotted with isolated hills (= kopjes)—worn down in places by rivers; *e.g.* Orange R., with tributaries Caledon, Modder, Vaal; R. Limpopo; R. Zambesi.

A mountainous rim shuts off this plateau from the sea—roughly 150 miles inland—pierced by the three big rivers in a series of unnavigable falls and rapids—rivers on outer slopes are comparatively short—chief ranges are Nieuwveld and Drakenberg.

A series of terraces descend to the coastal plain; these are clearly marked in Cape Colony, where they are called Karroos (from the Karroo grass)—(*D.* 125).



Rough diagram to show terraces in Cape Colony

Climate.

Cape Town is about Lat. 35° S. (roughly the boundary between Trade winds and Westerlies) (cp. Adelaide)—Durban is Lat. 30° S.

∴ (1) Prevailing wind is S.E. Trade, which collects moisture from Indian Ocean.

∴ East coast is hot, damp, and unhealthy.

Rainfall is heavy on seaward slopes of Eastern mountain-rim, esp. in summer, when the heat of the interior causes a monsoon effect.

Rainfall decreases behind the mountain-rim towards the interior, where is the Kalahari Desert (*D.* 145)—agriculture in the interior suffers from lack of moisture; practically no rain falls except between November and February, so that the storms of rain have to be supplemented by irrigation (by wells or by storing the spasmodic rainfall), and special "dry-culture" is practised—rivers are useless for irrigation, because they have worn deep beds below the surrounding surface—the plateau is dry and healthy.

(2) In winter (*i.e.* June, July) the sun's heat falls mainly on the Northern Hemisphere, and the boundary between Trades and Westerlies shifts further North, so that the S.W. corner receives a wet N.W. wind (*cp.* Australia).

∴ land round Cape Town has a winter rainfall ("Mediterranean climate").

Communications and Minerals.

Railways and Minerals are closely related in South Africa—its chief source of wealth still lies in its mines, esp. gold and diamonds—railways are chiefly concerned with supplying food, materials, plant, etc., for the mining centres, and exporting mining produce.

Other controlling principles are—

(a) Agriculture is fast developing, and needs railways to open up the country—ox-wagons, on bad roads, are the only subsidiary means of communication—rivers are almost useless, because (1) very variable in volume, (2) blocked by rapids in passing the mountain-rim, (3) blocked at their mouths

by sand bars due to the amount of sediment which they carry.

- (b) The crossing of the mountain-rim of the terraces, and the climb up to the plateau, make railway construction very difficult—gradients of 1 in 35 are found.
- (c) The position of coal measures, chiefly near border of Natal and Transvaal.
- (d) Seaports.

Cape Town—a good harbour on Table Bay (North of Table Mountain), protected on N.W. by a breakwater—nearest to England, and \therefore used by mail steamers, etc.—traffic about equal to Durban; Port Elizabeth and East London have about one-tenth as much—very valuable as a port of call and coaling station on the route to the East.

Port Elizabeth—an open roadstead on Algoa Bay—unprotected on the S.E., but much used for trade because convenient for its hinterland.

East London—protected by a breakwater—chief port for South-eastern district.

Durban—nearest British port to Johannesburg—useful harbour, though shallow, with a shifting bar.

[Lourenço Marques—nearest port to Johannesburg—a good harbour, but Portuguese.]

1874–84. Railways were built from the southern ports to Kimberley, where diamonds had just been discovered.

1886. Discovery of gold at Johannesburg—lines were built from the ports to serve this new centre.

The chief mining districts now are—

Gold—Johannesburg (annual output £31,000,000—D. 142)—a little in other parts of Transvaal, and in Rhodesia (£2½ million).

Diamonds—Kimberley (annual output £4½ million—D. 135)—

Premier mine near Pretoria (£1½ million)—S.W. of Orange Free State (£1½ million).

Coal—N.W. Natal (£600,000), S.E. Transvaal (£900,000).

Iron is found in many places, *e.g.* near the coal in Natal—will be important when the country is more developed.

Chief railway lines are—

- (1) Western line ; Cape Town—de Aar—Kimberley—Mafeking—Bulawayo—Victoria Falls—and beyond to the boundary of Congo Free State.
- (2) Lines from the 3 southern ports to the Transvaal.
Cape Town—de Aar—Naaupoort—Bloemfontein.
Port Elizabeth—Rosemead Junction—Bloemfontein.
East London—Springfontein—Bloemfontein.
These continue to Pretoria *via* Johannesburg.
- (3) Durban—Pietermaritzburg—Ladysmith—Kroonstad—Newcastle—Johannesburg.
- (4) [Lourenço Marques]—Johannesburg and Pretoria.

Agricultural products—much less valuable than mineral—not even sufficient, at present, for the inhabitants.

Maize (= mealies) is distinctive cereal of S. Africa—well adapted to sowing in their wet summer and reaping in dry sunny winter—chief food of the natives—useful for winter fodder.

Wheat is grown chiefly round Cape Town (winter rains) and Caledon R.

Fruit—tropical fruits near East Coast—grapes (vine) near Cape Town (winter rains ; *cp.* Mediterranean lands).

Tobacco, esp. on Little Karroo, and in Transvaal.

Sheep—annual wool crop £3,600,000—best farms are on Great Karroo.

Goats—valuable for mohair—flourish on good grasses, *e.g.* Great Karroo.

Cattle—liable to disease in low hot climates.

Ostriches—mainly on Great Karroo, fed on lucerne—annual export of feathers £2,000,000 (*D.* 133).

Cape of Good Hope (= Cape Colony)—winter rains in S.W., summer in E., no rain in N.W.—the Karroos suffer from drought; but the Karroo bush provides some food for the herds, and occasional storms revive the grass—mainly pastoral; sheep (wool), goats (mohair) and ostriches, especially on Great Karroo; cattle—wine and wheat in district of winter rains; other cereals (maize, oats, etc.) in other parts—diamonds (Kimberley) are the most valuable export.

Cape Town—capital of Union—population 170,000—focus of trade, etc., for its hinterland—beautiful situation, backed by Table Mountain (3,500 ft., flat-topped ∴ composed of horizontal strata).

Kimberley—greatest diamond centre—population (35,000) about equal to Port Elizabeth, and to the capitals of Natal, Transvaal, and Orange Free State.

Port Elizabeth and East London have considerable trade, though their damp heat is unhealthy; population in the East is mainly on the higher terraces, e.g. Grahamstown, which is very healthy.

Natal—three clearly marked terraces.

- (1) Coast belt—hot, damp, unhealthy—tropical fruits (pine-apple, banana, orange, lemon) outside tropics; sugar; tea on well-drained slopes.

Durban—chief port for Natal and Transvaal—population 68,000.

- (2) Midland belt—cooler, healthy—contains centres of population—mixed farming; esp. cereals (maize), potatoes, turnips; cattle (which cannot live on coast belt).

Pietermaritzburg—capital—in a healthy situation.

- (3) Upland belt—similar to Midland belt, but cooler—mixed farming—coalfields in N.W., crossed by railway.

Ladysmith is important railway junction, commanding entrances to Transvaal and Orange Free State.

Newcastle is one of the coal mining towns—coal is useful for ships at Durban, and export to Bombay.

Orange Free State—mainly high veld, about 5,000 ft. above sea-level—partly bounded by Orange R. and its tributaries the Caledon and Vaal—mixed farming (sheep and cattle; maize)—valley of R. Caledon (near Basutoland) is very good for grain crops—very inferior to Transvaal in minerals—suffers from lack of timber.

Bloemfontein—capital, in central position.

Transvaal—across R. Vaal—rainfall plentiful in East, decreasing towards West—climate and products depend on altitude—gold is far the most valuable asset.

- (1) Drakenberg Mts.—heavy rainfall—forests.
- (2) Low Veld—under 1,500 ft.—in river valleys, *e.g.* R. Limpopo, and near eastern boundary—malarial, but suitable for sub-tropical products, *e.g.* cotton.
- (3) High Veld—plateau about 5,000 ft. high—treeless grasslands—some pastoral produce (sheep, goats, cattle)—maize in S.W. under irrigation.
- (4) Bush Veld—lower lands, *e.g.* round Pretoria—warmer—mixed farming—fruits (apple, orange, etc.); tobacco.

Pretoria—capital: it was old agricultural centre before gold was discovered—junction of railways to Johannesburg from Lourenço Marques and Middelburg (coal), and from the North and West (fruit)—diamonds are found in the neighbourhood.

Johannesburg (population 150,000)—gold is found along a ridge, Witwatersrand (= the Rand), for nearly 30 miles to East and West; worked with coal from S.E. Transvaal; annual output is £31,000,000 (= $\frac{1}{3}$ of world's supply; *cp.* W. Australia £7,000,000).

Three Protectorates belong to the South African group of colonies, ruled by resident Commissioners, who represent the Governor-General—

Basutoland—a small State on the inside of Drakenberg—only open towards the S.W., where the Caledon valley is suitable for wheat cultivation—good pasture on the highlands.

Swaziland—a smaller State, on the outside of the mountain-rim—little developed—some mines (gold and tin)—unhealthy in the low East.

Bechuanaland—a large dry land on the plateau, containing the Kalahari Desert—cattle and sheep find some pasture.

Also **Rhodesia**, belonging to British South Africa Company, under charter from King of England—due to Cecil Rhodes' energy—a huge, little-developed district—being on the plateau (about 5,000 ft.), it has healthy climate, though in the Tropics—divided into Northern and Southern Rhodesia by R. Zambesi, which is famed for the finest Falls in the world (Victoria Falls—*D.* 148), but is navigable in most parts—L. Tanganyika is useful for commerce in the North.

There are great possibilities—gold, coal, and iron are found in many parts—the soil is fertile, and sub-tropical products (*e.g.* cotton) can be grown—good grass for cattle, though tse-tse fly prevents stock-rearing in Eastern lowlands—the park-lands abound with big game (lion, elephant, hartebeest, rhinoceros).

Salisbury is capital of Southern Rhodesia, Bulawayo the chief commercial and railway centre.

Nyasaland (*D.* 246) is a Protectorate between N.E. Rhodesia and L. Nyasa—sub-tropical produce, *e.g.* coffee, tobacco—unhealthy in river valleys; unsuitable for white population, except on highlands—trade on L. Nyasa and R. Shiré, which flows from it to R. Zambesi.

Other British possessions in Africa lie in the Tropics, on the East and West coasts; Egypt and Egyptian Sudan are more properly associated with Turkey.

British East Africa—a typical coastal province, with zones of different characteristics parallel to sea coast—a railway crosses these zones, running from Mombasa (capital, on an island) to Victoria Nyanza, on which steamers ply.

- (a) Coastal plain—hot, moist climate—mangrove swamps—tropical products; *e.g.* rice, coconuts, forests (rubber, ebony), etc.; ivory.
- (b) Mountain-slopes—little rain \therefore wind blows parallel to coast rather than inland.
- (c) Plateau—bare lands with acacia-scrub.

Further West, grassy plains suitable for grazing in volcanic region—crossed by Rift Valley—Mt. Kenia (18,600 ft.), on the Equator, has zones of vegetation rising to perpetual snow—parts are visited by sportsmen in search of big game, *e.g.* lion, antelope; also rhinoceros and zebra are found.

Uganda Protectorate (*D.* 243)—on the plateau—dry in North, wet in South near Victoria Nyanza (second largest freshwater lake in the world) and Ruwenzori Mts. (up to 17,000 ft.)—in the wet districts there are tropical forests; bananas; cotton could be cultivated; ivory—development from E. coast was hindered by the dry belt of East Africa.

Zanzibar—ruled by Sultan under British protection—an island 200 miles south of Mombasa—tropical products, esp. cloves.

On the West coast, rain is brought by S.W. monsoon in summer; but most of it is condensed by the mountains which run parallel to coast, so that rainfall decreases inland towards the Sahara Desert—zones of vegetation again run parallel to coast.

- (a) Coastal belt—damp and unhealthy—unsuitable for Europeans (blackwater fever, dysentery)—mangrove swamps on Guinea coast and near rivers, with tropical forests further

inland, producing oil (esp. palm-oil used in making candles, soap, etc., and ground-nut oil), rubber (derived from creepers—*D.* 237), some ivory (elephants), cabinet woods (mahogany, ebony) — Negro inhabitants were formerly decimated by slave trade.

- (b) Inland, forests merge into savannas—more open land, fertile and good for cultivation of cereals (maize ; wheat further North), cotton, vegetables—Negroid races of fine physique (*e.g.* Hausas) cultivate the soil ; their religion, Moham-medanism, spreading southwards—the interior was highly civilised in the Middle Ages ; but, owing to the unhealthiness of coastal belt, has only recently opened communication to the Gulf of Guinea—it is fairly healthy for Europeans.

Gambia—a narrow strip on each side of R. Gambia—has a good port (Bathurst) much used by French hinterland.

Sierra Leone—has a good port at Freetown, with railway inland.

Gold Coast—railway inland—produces some gold (£1,000,000 annually) which is washed down by R. Volta.

Southern Nigeria (*D.* 233)—capital Lagos—contains the wide delta of R. Niger, which has brought much alluvial deposit—rainfall over 100 inches on lower slopes of mountains—even more unhealthy than other parts of the coast ; but its products are valuable (esp. palm-oil, rubber, kola-nuts).

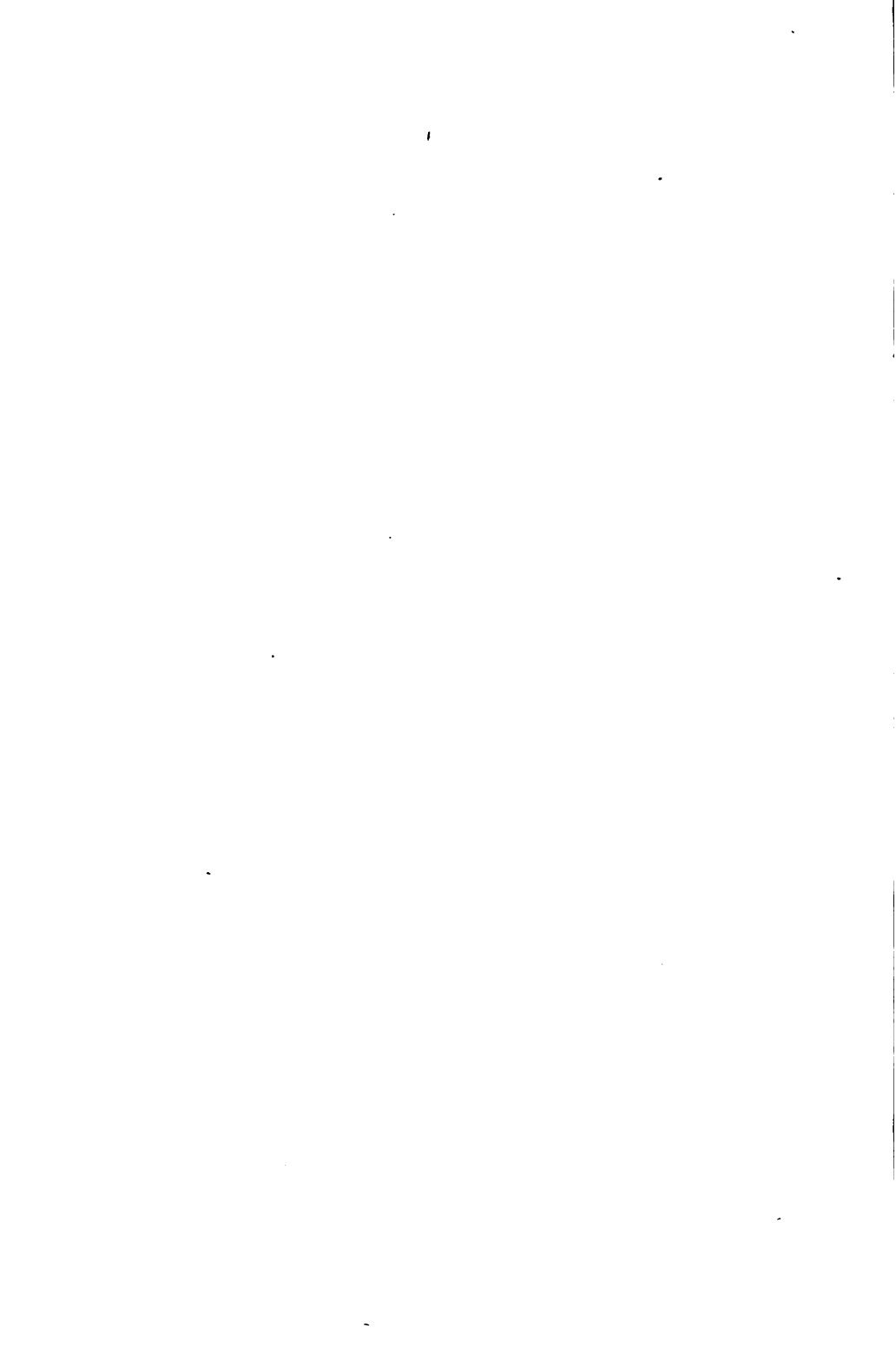
Northern Nigeria—acquired by Royal Niger Company c. 1886—ruled by High Commissioner since 1900, with Zingeru as capital—R. Niger (navigable up to Rabba, 150 miles above junction) and R. Benué provide valuable water transport ; railways from Lagos to Ilorin, and Rabba to Kano (*D.* 240) ; caravan routes connect the chief towns ; considerable trade to the North across the Sahara—salt in inland drainage area near L. Chad—has a great future ∴ a fairly healthy tropical country, capable of producing excellent cotton, etc. (*D.* 236)—agriculture is increasing (grain, vegetables).

QUESTIONS

Rough maps should be drawn, when possible, to illustrate answers.

1. Draw a rough map of the Union of South Africa, showing the four States of the Union. Mark the chief districts in which the three most valuable minerals are found.
2. Give some account of the routes by which Johannesburg is connected with the sea coast.
3. Compare the climates of Cape Town and Durban. What are the products characteristic of each?
4. Comment on the position and importance of Ladysmith, Port Elizabeth, Pietermaritzburg, Pretoria, Mombasa, Winnipeg, Vancouver (town).
5. Of what use to S. Africa are its rivers?
6. What are the characteristics of a journey inland from the coast in Africa? Illustrate your answer by reference to journey to Uganda or Pretoria.
7. What is the special value of Northern Nigeria to the British Empire?
8. Describe the possible routes for exporting grain from Manitoba to England.
9. Compare the position and importance of Montreal and Halifax, Regina and Calgary.
10. What districts of Canada are famous for gold, fur, salmon, lumber, coal, fruit?
11. What causes control the distribution or population in Canada? Compare with Scotland.
12. What are the future prospects of British Columbia?

THE BRITISH ISLES



THE BRITISH ISLES

References to pages in Mackinder's "Britain and British Seas" (= B.).

THE British Isles—a small group of islands on the N.W. of Europe—having narrow seas as a protection from, and a connection with, the most populous countries of the Continent—open towards the fast-developing lands across the Atlantic—Mistress of the Seas, and therefore capable of protecting the largest Empire and most extensive commerce that the World has ever seen.

	Area in sq. miles.	Population.	Density per sq. mile.
England . . .	51,000	31,000,000	608
Wales . . .	7,500	1,700,000	226
Scotland . . .	30,000	4,500,000	150
Ireland . . .	32,500	4,500,000	138
British Empire .	11,000,000	400,000,000	36

PHYSICAL FEATURES.

The mountains can be arranged in a few groups which are easy to remember.

Their general characteristics are :—

- (1) The lines of most mountains and valleys run in a $\begin{smallmatrix} \text{N.E.} \\ \diagup \\ \text{S.W.} \end{smallmatrix}$ direction, especially in Scotland and Ireland, somewhat like the grain of a piece of wood.
- (2) The N.W. is exceedingly rugged and battered ; and the various ridges become less rugged, less hard, and less high as one moves down to the S.E. corner.

This can be accounted for geologically : for the N.W. is composed of much older rocks ; *i. e.* of layers of deposits which were laid down far earlier than those in the S.E.—*e. g.* the N.W. is largely composed of rocks like granite, which are hard and unfertile ; whereas the S.E. is of Tertiary, or later, formation, containing soils like limestone, chalk, sand, clay, which are mostly flatter, smoother, and more fertile.

The principal blocks of mountains and valleys are :—

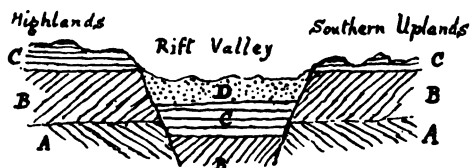
- (a) The Highlands, of which the main features are—

Outer Hebrides—a submerged ancient range parallel to the “grain.”

N.W. Highlands and Grampians, separated by Glen-More.

(Mountains of Donegal belong to the same system.)

- (b) The Rift Valley, due to the sinking of a block of land between two faults (*B. 69*), *cp.* Glen-More and Jordan-Red Sea-L. Tanganyika.



Oldest Rocks = A Later Rocks = C
Less old ,, = B Carboniferous = D

Rough Diagram, showing how a Rift Valley may be formed between two Faults :
part of the layer C and all D, which once covered the whole district,
have been washed away except where protected in the Valley.

(L. Neagh and R. Blackwater are a continuation of this rift.)

- (c) Southern Uplands.

Lowther Hills, from which run R. Tweed, Clyde, Annan in opposite directions.

Cheviot Hills. (Mourne Mountains belong to the same system.)

- (d) Pennine Mass, of varying width, with Crossfell, Bowfell, Whernside, Peak—R. Aire and South Tyne have worn “gaps” (= passes) which are used by Midland Railway and N.E. Railway.

- (e) Cumbrian mountains—the “Lakes”—an uplifted dome with lake-filled valleys radiating in all directions from Scafell and Helvellyn (Derwentwater, Windermere): the ridge of Shap-fell joins this district to the Pennines, and proves a serious obstacle to M.R. and N.W.R.

Welsh or Cambrian Mountains, with Snowdon, Wicklow Mts. (in Ireland), and Snaefell (in I. of Man), may be grouped with these.

- (f) South-Eastern Plain, with “Scarp-lands” (*B.* 84).

Limestone Ridge, including N. York Moors, Lincoln Heights, Edge Hill, Cotswolds.

Chalk Ridge, including Flamborough Head, Yorkshire Wolds, Lincoln Wolds, East Anglian Heights, Chiltern Hills (Goring Gap); Marlborough Downs, Salisbury Plain.

North and South Downs (chalk), which branch out from Salisbury Plain, and end in South Foreland and Beachy Head.

- (g) S.W. Ireland is made up of parallel ridges and valleys (*B.* 135); e.g. Macgillicuddy’s Reeks, Bantry Bay, R. Suir, Blackwater, Lee.

CLIMATE.

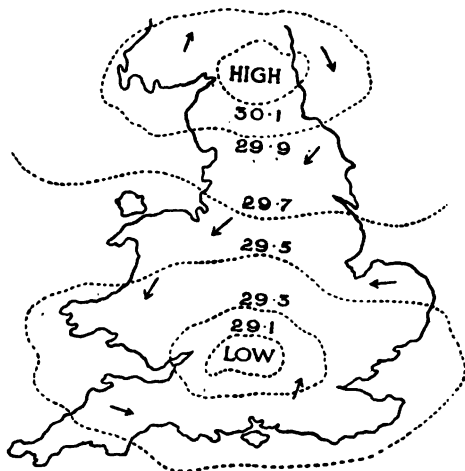
The weather of a country depends largely on the nature of its surface and its winds.

Great Britain lies between lat. 50° and 60° N., *i.e.* in the “Westerlies” area, so that the commonest wind is the S.W.: this reaches us after blowing over the Atlantic, from warmer latitudes.

- (1) This causes, by friction on the surface of the ocean, the North Atlantic Drift (wrongly called the Gulf Stream), which is a current passing our western shores in a N.E. direction; so that our seas are warmer than might be expected.

Cp. Canada, where there is a similar effect on the West; but the East coast is much cooler.

- (2) Before reaching our shores the wind has collected a large supply of moisture (by evaporation) from the warm sea : it is ready to part with this moisture in the form of rain when it is sufficiently cooled, *e.g.* by passing over mountains, especially in our cooler latitudes. Other winds are less likely to cause rain, because they blow from a colder sea (*e.g.* N. wind) or overland (*e.g.* S.E. wind).



Weather Chart, showing Isobars ; Cyclone round Oxford, Anticyclone round Newcastle.

- (3) Cyclones are responsible for the varied "samples" of weather which characterize our climate. Like the small eddies on a river, these are eddies in the atmosphere, which drift over us—usually from the S.W. ; most often they drift along the N.W. coast of British Isles ; but other favourite tracks are *via* English Channel, or St. George's, or Bristol Channel. A cyclone implies a centre of low pressure (*B.* 156) ; the surrounding air, under higher pressure, seeks the lower pressure in the centre—thus starting a wind in that direction : but, owing to the rotation of the earth, all winds in the Northern Hemisphere have a tendency to swerve right-handed (in the Southern Hemisphere, left-handed).

Hence, with a centre of low pressure at Oxford, the winds would be more or less as shown in the diagram; *e. g.* S. at Eton, E. in Norfolk, N.W. at Gloucester. These winds tend to bring moisture towards the centre, especially those which come from the sea; and, in the centre of low pressure, there is always an upward draught, so that the rising air is cooled as it rises, and so tends to condense its moisture into rain. Hence a cyclone always involves unsettled weather as it passes over the country, and produces clouds and rain.

The converse situation, when there is a centre of high pressure, is called an anticyclone, and is likely to produce fine weather.

By combining the knowledge about winds and their moisture with that of the mountains, it is possible to guess the distribution of rainfall in any district. With our prevailing S.W. wind, the W. and S.W. slopes of mountains will have more rain than the N. and E., especially on the favourite cyclone track along the W. coast; *e. g.* W. Scotland is wettest (over 80" in places); W. Ireland, the Lakes, Welsh mountains have a heavy rainfall; but the E. has much less (under 25" in Cambridge) (*B.* 165).

The climate also depends on temperature, and this is affected by—

- (a) Latitude (*i. e.* distance from Equator); we, in the temperate zone, should expect moderate heat and cold—colder in the N.
- (b) Altitude: it is much cooler on hills and mountains (1° F. for every 300 ft.); this merely depends on local surface configuration, and would outweigh all other general principles: hence, in most temperature charts, isotherms are drawn for temperature "reduced to sea-level."
- (c) Proximity of Sea or Land: the sea acts as a reservoir of warmth in winter and coolness in summer; so that, being an island, Britain does not suffer from the extremes of heat and cold which oppress Moscow (in same latitude as Edinburgh—*B.* 167). The N.W. is more maritime than the S.E., because the latter is nearer to the land-mass of the Continent.

- (d) Winds : places exposed to the N. and E. winds are colder than those exposed to the warmer S. and W. winds.
- (e) Current : the warmth of the N.E. Atlantic Drift warms the W. coast in winter.

In summer, then, when the sun's direct influence is most felt, isotherms tend to follow parallels of latitude. But sea keeps the sea-board cool, so that they bulge downwards on Irish coast, St. George's Channel, etc. Greatest heat is in "Continental" Eastern counties.

In winter, sun has little effect, as compared with wind, current, and warmth stored up in the sea ; \therefore Eastern counties, and other places inland, have most cold. Isotherms run N. and S. (warmest on ocean side), with bulges of warmth up St. George's Channel and Severn valley (*B.* 166).

The S.E. has a "Continental" climate, as compared with the N.W., but the whole islands are really "Maritime."

Geography deals with the interaction between man and his environment ; *e.g.* his health, food-supply, occupations, etc., which depend largely on the local climate, *i.e.* the sort of weather. From the foregoing description, it should be possible to deduce this for any particular district, by considering its surface configuration and winds ; the consequent rainfall, the nearness to the sea, etc.

Forests used to cover most of the land ; these have been cleared in most places, and the following general principles apply to local occupations (*B.* 173, 322) :—

- (1) Manufactures where there is coal or other convenience.
- (2) Wheat where soil is good and sun sufficient—especially Eastern counties. Oats, more tolerant of rain, on the Western lowlands. Barley generally in the wheat districts. "Roots" and "grasses" are cultivated in rotation with cereals, for the sake of the soil.
- (3) Pasture seldom fails in our moist climate : \therefore cattle on the rich lowlands, especially in the wetter W., and sheep on the better-drained hills, especially the chalk ridges of the English Plain.

- (4) Fish, especially in the shallow North Sea.

The full study of Man in Britain should include a study of History, *e.g.* on the following lines :—

- (1) An Island : \therefore dependent on Navy more than on Army ; free from Continental troubles and devastating warfare.

Naval spirit inherent in blood of Vikings and other invading ancestors ; encouraged by our good ports and fishing in our productive shallow seas.

\therefore ready for exploration and colonization, especially when stimulated by excess of population.

Carrying trade of the world, made possible by our good ports and position at “the centre of the land hemisphere” near valuable markets, was secured by our Navy.

- (2) The greatest manufacturing country.

(a) Wool, produced on our chalk Downs, was exported for Flemish weavers ; and these, when driven from home, naturally sought the wool-producing land.

(b) When iron was needed, our local iron could be smelted by local forests ; later, coal and limestone could be had near the iron, which was of good quality for steel.

(c) The level plains favoured water-carriage ; canals and rivers made navigable by locks.

(d) Special local conditions were favourable ; *e.g.* moist air of Lancashire, for spinning ; water of Belfast for bleaching linen.

- (3) The effects of history—political, ecclesiastical, etc.

This accounts for the importance of many towns which are still administrative centres, though they have smaller populations than other towns whose geographical position is more favourable for development under modern conditions ; *e.g.* Winchester (capital of Wessex), Canterbury, York, Durham, Salisbury, Chester.

ENGLAND AND WALES

England may be roughly divided into two parts by a line from the mouth of the Tees to Exeter, rather West of the limestone scarp; these parts differ in many respects.

Generally speaking, the N.W. of this line—

- (1) Is geologically older, ∴ less fertile ∴ rocks are harder.
has coal, ∴ some surface rocks belong to Carboniferous period.
∴ it has a large industrial population, and is essentially "business."
- (2) Faces Atlantic Ocean, ∴ more maritime climate.
easier opportunities for American trade.
heavier rainfall, ∴ more mountainous.
- (3) Has no natural centre, ∴ complicated network of railways;
difficulty in avoiding mountains.

The S.E., on the other hand—

- (1) Is geologically newer, ∴ no coal, which implies fewer manufactures.
no serious mountains; easy lines of communications.
fertile soil, especially on East Anglian boulder clay; slighter rainfall.
- (2) Faces the Continent, ∴ more Continental climate.
occupied with Continental intercourse and defence.
- (3) Has its centre in London, ∴ Railways and roads radiate from London.
rural produce for London market.

INDUSTRIAL ENGLAND—the North-West and Midlands.

- (1) Pennine Mass and Lake District mountains are mainly sheep pastures, being very wet, and producing coarse grass.
- (2) Elsewhere, it is a "New Red Sandstone" Plain, of clays and sands, producing better grass, ∴ good for dairy produce.
- (3) Up to the middle of the eighteenth century, these conditions determined the character of the country—it was rough, uncultivated, sparsely peopled. Now that coal is so important, the position of coal-fields has far more influence on the inhabitants than anything else; hence, smoky mining towns have sprung up indiscriminately on pasturage and moorland, wherever there is coal.

Coal exists only in those basins where it has been protected by the lie of the land from the denudation which has swept it away from the more exposed parts; the coal-measures must once have covered most of N.W. England, and probably still exist under the later strata of the S.E.

The principal coal-fields are—

- (1) On each side of the Pennines.

Northumberland—Durham (shipbuilding).

York—Nottingham—Derby (wool, silk).

South Lancashire (cotton).

North Staffordshire (potteries).

South Staffordshire (hardware).

- (2) In the Bristol Channel basin.

South Wales (steam-coal, smelting).

The first produces the greatest tonnage, followed by S. Wales, Yorkshire, and S. Lancashire.

The distribution of industries among the coal-fields obeys the natural laws—

Shipbuilding where the coal is near to iron and the sea.

Textiles, and textile machinery, where raw material can be most easily brought.

Elaborate goods (*e. g.* watch-springs, screws), where transport is less easy.

- (a) Northumberland-Durham field specializes in shipbuilding (iron from Cleveland district of Yorkshire) ; it also exports coal.

Its towns cluster on three main rivers—

R. Tyne—Newcastle, Gateshead, Jarrow, S. Shields, N. Shields, Tynemouth.

R. Wear—Sunderland.

R. Tees—Stockton, Middlesbrough ; also Hartlepool. Darlington (N.E.R. works).

- (b) Yorkshire field is long and straggling ; towns are mostly at the foot of the Pennines, where the clear streams provide washing water for the wool and water-transport to Goole and Hull on the Humber. Most of the wool used to come from the Lincolnshire Downs, whose dry climate produces a long “staple” ; much of it is now imported.

Woollen goods, and worsted, are manufactured in the North—Leeds, Bradford, Halifax, Huddersfield, Wakefield.

Silk goods in the South—Derby, Chesterfield.

Knives and small iron goods at Sheffield (the local Millstone Grit is good for grindstones).

- (c) S. Lancashire field specializes in cotton and its kindred industries : the reason for this is the peculiar moisture of its climate, which makes it possible to weave fine threads without breaking them. It is also well placed for importing raw cotton (especially from U.S.A.), helped by the Manchester Ship Canal.

Manchester-Salford, on R. Irwell, is the collecting and distributing centre of the district (*e. g.* shops, market, machinery), surrounded by manufacturing towns (Wigan, Bolton, Bury, Rochdale, Oldham, Stockport) which seek purer water and water-power higher up the surrounding valleys.

Liverpool-Birkenhead, at the mouth of the Mersey, was an unimportant village 200 years ago : now, the second port

in England, owing to the development of its valuable "hinterland": connected with Manchester (ship canal), Yorkshire coal-fields (rail and canal *via* Aire Gap), Potteries and Birmingham (rail and Weaver canal); it exports most of their produce, and imports much of their raw material and food-supply.

Ribble valley contains the cotton towns of Preston, Blackburn, Burnley.

[There is also a small coal-field in N. Cumberland; but Barrow-in-Furness, where the iron (specially good for steel) has created a great shipbuilding industry, needs the better coal from the Durham field.]

- (d) N. Staffordshire field—The Potteries. Local clay is used for coarse work, finer clay from Cornwall for china. Wedgwood made this district famous.

Hanley, Stoke, Burslem, Newcastle-under-Lyme are close together.

(Derby and Worcester also make famous porcelain.)

- (e) S. Staffordshire field—"The Black Country"—iron is found in the neighbourhood, though some is imported. The whole district is really an immense workshop, having Birmingham as its centre: being on a plain, communication by rail and canal is easy in all directions; but, being far from the sea, it specializes in manufactures such as hardware, in which considerable skill and labour are needed, and whose bulk is small.

Birmingham—collecting and distributing centre—university—makes steam engines, firearms, jewellery, and small metal goods.

Redditch (needles, fish-hooks), Bromsgrove (nails), Kidderminster (carpets), West Bromwich, Wolverhampton; Coventry (cycles, motors).

- (f) S. Wales, famed for "best steam-coal" (or anthracite) which is very valuable for ships—iron-ore on the Northern edge of the coal-field.

Cardiff is the chief port, connected with Merthyr-Tydfil, the chief iron-mining centre among the hills: both manufacture tin-plates (made of iron coated with tin).

Swansea (smelting of iron and copper), Newport (export), Llanelli (smelting).

[Bristol has a small coal-field; its approach by the Clifton gorge is inadequate: but it has various manufactures, chiefly connected with the W. Indies trade which made it pre-eminent in the sixteenth century.]

Apart from these mining and manufacturing districts, the towns of Industrial England have developed by a natural growth as foci of traffic, or ports, or agricultural centres, and these may best be taken with Metropolitan England.

METROPOLITAN ENGLAND—the South-East.

It is most convenient to take similar places together.

- (1) Agricultural centres; towns are the markets, shopping centres (*e.g.* for agricultural implements)—manufactures of local products—placed in the middle of the agricultural district; towns originally grew where the ancient road crossed a bridge or ford, or in a good defensive position, *e.g.* Durham, Edinburgh (*B.* 331).

e.g. cattle in the well-watered Central plain provide dairy (*e.g.* Cheshire cheeses) and leather (Leicester and Northampton boots) industries.

Sheep on the coarser grass of the better-drained hills started the woollen industry in Yorkshire and Gloucestershire.

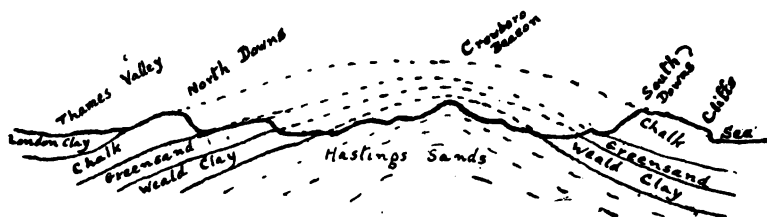
Cereals in the drier East explain the straw-plait industry at Bedford and Luton, and manufacture of implements at Norwich.

Hops in the Weald make Maidstone brewery famous.

Ancient educational centres (*e.g.* Oxford, Cambridge) were probably founded in the neighbourhood of the agricultural land with which they were endowed; modern Universities are in manufacturing centres, *e.g.* Manchester, Birmingham.

(a) The Weald, in Kent, Surrey, Sussex.

It consists of wooded sand-hills (*e.g.* Crowboro' Beacon), surrounded by oval belts of clay, greensand, chalk, in succession ; of which the chalk forms a ring of scarp-lands (N. and S. Downs).



Rough Section through the Wealden Uplift from North to South,
showing continuity of Strata.

Probably these belts are the remains of a dome, composed of these soils, which once covered the whole district.

The continuity of the chalk appears in the white cliffs on each side of the Straits of Dover ; S. Foreland and Beachy Head are chalk cliffs ; Dungeness is merely a sandbank.

The chalk Downs produce excellent mutton ; the sandy clays of the "Garden of England" are famed for orchards and hop-gardens (*e.g.* Maidstone).

The inland towns are mainly in the gaps by which rivers flow through the scarps : *e.g.* Maidstone on the Medway, Guildford and Godalming on the Wey. The towns on the sea-coast are packet-stations, or watering-places (Margate, Ramsgate, Eastbourne, Brighton ; Tunbridge Wells inland. Cp. Bournemouth, Southsea, I. of Wight).

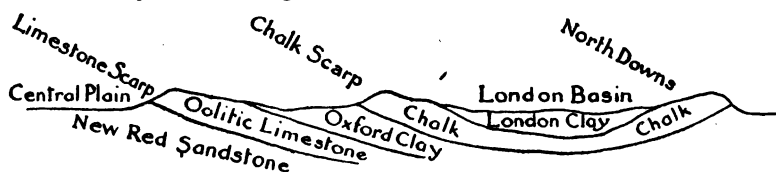
(b) Salisbury Plain, a rolling grass plateau, in which the chalk ridge meets the N. and S. Downs ; suitable for military purposes ; open and healthy.

(c) The S.W. Peninsula owes its importance to its mild winter climate (maritime) : early vegetables and flowers are sent up to the London market, especially from the Scilly Isles (and Channel

Islands ; fishing is also important, as in Elizabethan times ; “The English Riviera” (Penzance, Falmouth, Torquay) ; cattle ∴ good rainfall.

(d) The Thames valley includes the Upper Thames, Cherwell, and Thame, which drain the valley between the two ridges ; their waters combine near Wallingford and pierce the chalk Chilterns in the Goring Gap, and continue the line of the Kennet (met at Reading in the London basin), receiving the Colne and Lea from the Chilterns, and the Wey and Mole from the Weald. This is mainly a farming district feeding the London market (*e.g.* milk). Railways, radiating from London, take advantage of any gaps in the hills which the rivers have eroded ; *e.g.* G.W.R. (Goring Gap), G.C.R. (Wycombe), M.R. (R. Lea).

(e) East Anglia, an agricultural region, specially suitable for wheat because (1) the Glacial period left a deposit of Boulder clay, which is very fertile ; and (2) there is more sun than in other parts of England. The towns are market centres, and manufacture agricultural implements ; *e.g.* Norwich.



A rough section across England from Warwickshire to Kent, showing Limestone and Chalk Scarps.

(f) The Fens, low-lying alluvial land round the Wash, partly reclaimed from the sea ; drained by Ouse, Nen, Welland, between the ridges. Mainly agricultural : *e.g.* vegetables for London market, peas, beans, potatoes, turnips ; sheep on the grass-covered ridges.

(g) The Central Plain contains the valleys of Wye, Usk, Severn, Avon ; Weaver ; and Trent, Witham, which pierce the limestone in the Humber and at Lincoln. It lies between the limestone ridge, the Pennines, and the Welsh Hills, with two “gaps” to the milder sea-air (Cheshire, Severn).

The natural character of the district, a fertile plain with sufficient moisture, accounts for its agricultural success—cattle give rise to dairy industries and leather trades (*e.g.* Leicester)—fruit and hops in the S.W. (Burton beer). Its mineral wealth has led to the industrial development of certain regions: *e.g.* the Black Country (on G.W.R. and M.R.), the Potteries (on N.W.R. with its works at Crewe), the South of the Yorkshire coal-field (on G.C.R., and M.R. with works at Derby); also salt-mines in Cheshire (*e.g.* at Nantwich; salt is used for chemicals at St. Helens, needed for dyeing cotton).

(h) The Vale of York, a fertile plain watered by the Ouse and its tributaries (*e.g.* Aire, Calder) between the Limestone ridge and the Pennines; famous for horses. Being on the natural route to Scotland and the North, it contains many historic battle-fields (*e.g.* Towton, Marston Moor). It is crossed by the N.E.R. running Northwards, and has much rail and water traffic between the coal-field and the Humber.

(2) Sea-ports depend on harbour (natural or artificial), “hinterland,” communications inland and seaward, and situation with regard to countries with which it trades.

Ports serving the main industrial districts have been mentioned: *e.g.* Newcastle, Hull, Bristol, Cardiff (third in S. Britain), Liverpool-Birkenhead (second).

Fishing-ports for Dogger bank, etc.: Grimsby, Yarmouth.

London, the most important city in the world (*B.* 253): focus for the trade route through the Straits of Dover opposite Continental ports with vast “hinterlands”; tidal estuary into the heart of the city; good communications inland in all directions by rail and canal; many and various manufactures, *e.g.* breweries (hops of Kent, barley of East Anglia); jam factories (fruits of Kent); shipbuilding is departing. Many suburbs, *e.g.* Woolwich (arsenal), Greenwich (observatory).

Continental traffic—Harwich to Hook of Holland (G.E.R.).

Queenboro' to Flushing	} (S.E. & C.R.).
Dover to Calais and Ostend	
Folkestone to Boulogne	
Newhaven to Dieppe (L.B. & S.C.R.).	
Southampton to Havre (L. & S.W.R.).	

Southampton ; well protected, but needs dredging ; double tides ; good train service to London and the North : head-quarters of steamship lines to America and S. Africa.

Naval dockyards—Chatham, Sheerness ; Portsmouth ; Plymouth—Devonport.

Irish traffic. Fishguard to Rosslare (G.W.R.).

Holyhead to Kingstown (Dublin) and Greenore (N.W.R.).

Bristol, Liverpool for agricultural produce.

(3) Railway centres :—*These must be traced on a map which shows physical features.*

S.E. & C.R.—*Agricultural produce ; Continental traffic ; Excursions from London.*

London—Canterbury—Margate and Dover.

N. of Downs.

—Tunbridge—Dover and Hastings.

Tunnel through N. Downs.

L.B. & S.C.R.—*Same kind of traffic as above.*

London—Brighton—Hastings and Portsmouth.

L. & S.W.R.—*Southampton traffic ; Watering-places.*

London—Basingstoke—Southampton—Bournemouth.

Tunnels through Downs.

—Salisbury—Exeter—Plymouth.

N. of Dartmoor.

G.W.R.—*Cornish Riviera ; coal-fields of S. Wales and Birmingham ; Irish traffic.*

London—Reading—Newbury—Exeter—Plymouth—Penzance.

Thames valley.

S. of Dartmoor.

—Didcot—Swindon—Bristol

Goring Gap.

N. of Marlborough Downs.

—Cardiff—Swansea—Fishguard.

Severn tunnel. By coast.

—Oxford.

—Banbury—Birmingham—Shrewsbury—Birkenhead.

L. & N.W.R.—*Staffordshire and Lancashire coal-fields ; Liverpool, Scotland, Ireland.*

London—Rugby—Crewe—Bangor—Holyhead.

Berkhampstead Gap.

By coast, Menai bridge.

—Warrington—Carlisle.

—Liverpool and Manchester.

G.C.R.—*Yorkshire and Lancashire coal-fields ; fish.*

London—Rugby—Leicester—Nottingham—Sheffield—Manchester.

Wycombe Gap.

—Grimsby.

M.R.—*Yorks, Lancs, Birmingham coal-fields ; Scotland.*

London—Bedford—Leicester

Manchester.

R. Lea.

—Derby—

Bristol—Gloucester—Birmingham

Sheffield—Leeds—Carlisle.

Aire Gap, Ribble, Eden.

G.N.R.—*Agricultural ; traffic of N.E.R.*

London—Peterborough—Doncaster—York.

N.E.R.—*Newcastle coal-field ; Scotland.*

York—Newcastle—Berwick—(Edinburgh).

By sea coast.

—Carlisle.

S. Tyne valley.

G.E.R.—*Agricultural ; Suburban.*

London—Cambridge—Ely

—Norwich.

—Chelmsford—Ipswich

SCOTLAND

(A) The HIGHLANDS, very mountainous.

The moors and rivers attract sportsmen for grouse, deer, fish (*e.g.* Findhorn, Spey); and these are more remunerative than the sheep-farming.

The native population is concentrated on E. coast—flat and fertile—farming and sea-fishing. Inverness is the “capital” of the Highlands; Fort William the other end of Caledonian Canal; Aberdeen has granite-quarries, university, sea-fishing.

The scenery, especially on W. coast, attracts tourists to Oban, Mallaig, I. of Skye, etc.

Notice also Orkney and Shetland Isles, which must once have been joined to the mainland—now cut off by Pentland Firth, through which the tide races.

Skye and Mull, whose fine scenery is of volcanic origin (*cp.* Giant’s Causeway).

Promontories, Islands, Lochs running along the “grain”—F. of Lorne, Glen More (= the great glen) with Caledonian Canal, Jura-Isay, Mull of Cantyre.

Loch Lomond.

Railways work their way northwards as best they can.

- (1) Central route (Highland Railway), using Tay valley, Pass of Killiecrankie, Glen Garry, Strath-Spey, from Perth to Inverness: on to Wick and Kyle of Lochalsh by creeping round the Lochs and Mountains.
- (2) G.N. of Sc. serves fertile E. coast between Aberdeen and Elgin.
- (3) W. Highland R. from Glasgow to Mallaig, *via* L. Lomond, Rannock Moor, Fort William.
- (4) Caledonian R. joins Aberdeen, Perth, Oban.

(B) The RIFT VALLEY—far the most important part of Scotland, because of its coal, iron, levelness, fertility, and consequent population. The sunk ancient rocks are covered by coal-measures, which have been partially protected from denudation by the Highlands and Southern Uplands: hence there is coal in the Ayr, Clyde, and Forth basins.

(1) Ayr field—exports to Belfast, which needs a large supply—carpets, etc., at Kilmarnock.

(2) Clyde field, in Lanark and Renfrew.—Glasgow (860,000 population) is the centre, surrounded by smaller towns, Paisley (90,000), Hamilton, Wishaw, Motherwell, Coatbridge, Airdrie. The many industries are best understood from the history of Glasgow.

1718. Trade started with America in tobacco and sugar for its fine “hinterland” from Aberdeen to Berwick; no rival ports; good communications inland.

1772. Deepening of the Clyde up to Glasgow, which had the lowest bridge. “The Clyde made Glasgow; Glasgow made the Clyde.” Import of cotton (cp. Liverpool); great cotton-weaving district.

1831. Development of local iron; manufacture of machinery, etc.

The principal industries now are—

Shipbuilding all down the estuary, especially at Glasgow.

Machinery of all kinds—boilers, pipes, locomotives, sewing-machines (Singer’s at Killowrie).

Sugar refinery (especially at Greenock), chemicals.

Textiles, especially cotton (Paisley shawls).

(3) Round Firth of Forth.

Carron and Falkirk are iron-foundries.

Textiles at Dunfermline (fine linen) and Kirkcaldy (linoleum).

The ancient historical route from South to North, up the East Coast, passes Bamboro’ castle (Flodden, 1513), Berwick-on-Tweed,

Dunbar (1650), Preston Pans (1745), Pinkie Cleugh (1547), Edinburgh, Falkirk (1746), Bannockburn (1314), Stirling, Sheriff Muir (1715).

Edinburgh—a fine castle on a rock at entrance to Rift valley—

Capital (though Glasgow is double the size), with headquarters of all national institutions (Kirk assemblies, Law-courts, Picture-galleries)—printing.

Stirling—castle near the lowest ancient bridge over the marshy Forth.

St. Andrews—Royal and Ancient Game of Golf—University.

The Sea-ports on the East are—

Leith, the port of Edinburgh.

Grangemouth, the Eastern end of the Forth and Clyde canal.

Perth, famed for Pullar's dye-works (a by-product of coal); a focus of routes.

Dundee, chief port on the Tay; textiles (jute from Ganges, flax from Baltic); seal and whale fisheries; jam and marmalade.

Arbroath—coarse textiles (sail-cloth).

Notice Strathmore (= the great valley), and Carse of Gowrie (whose fruit started Dundee jam factory). Line of hills—Sidlaws, Ochils, Campsie Fells. Firths of Tay, Forth, Clyde, cutting deep into the land; useful for sea-traffic.

Land communications are hindered by these deep inlets of the sea: principal railways are—

Edinburgh—Dundee—Aberdeen.

Forth and Tay Bridges.

— Perth — Aberdeen.

Forth Bridge.

—Highlands.

Edinburgh is also connected with Stirling and Glasgow, besides the routes to England: Glasgow feeds the North *via* Stirling, or the West Coast,

Canal from Grangemouth to Clyde gives Glasgow an opening to the East.

(C) SOUTHERN UPLANDS, with fertile Tweed valley.

The Lowther Hills are the water parting of R. Clyde, Tweed, Annan : the rich grass of the lower slopes gives pasture to thousands of sheep ; hence the textile ("Tweed") industry in the Tweed basin at Hawick, Jedburgh, etc.

Mixed farming (*e. g.* roots, vegetables) on the flatter banks of the rivers, and in the district of Lothian (which is the lowland round the coast of Haddington and Berwick counties).

The "Border" was very prosperous in early times ; *e. g.* David I founded many abbeys on its fertile lands ; their ruins at Melrose, Jedburgh, etc., are the result of the border warfare of the Middle Ages. Its romance and beauty have endowed it with much literature (Sir Walter Scott).

Communications find considerable obstructions to routes connecting Edinburgh and Glasgow with Newcastle and Carlisle (*B.* 286).

- (a) The East Coast route—the old historical road from Newcastle to Edinburgh *via* Berwick (North British R.).
- (b) The "Waverley" route—Carlisle to Edinburgh, by valleys of Liddel, Teviot, Gala (North British R.).
- (c) Route over Lowther Hills—

from Carlisle—Carstairs

Edinburgh

Stirling

Glasgow

; very steep gradient

using R. Annan and Clyde (Caledonian R.).

- (d) Carlisle to Glasgow, *via* Gretna Green and low hills into the Ayr coal-field : branch to Stranraer, for Ireland (Glasgow S.W.R.).

IRELAND

In 1841 its population was over 8,000,000; since the potato famine of 1845-6 it has steadily decreased; it was 4,500,000 in 1901. The unruly state of the country and difficulties of land-tenure have led many to emigrate to America.

"The Emerald Isle"—so-called from the perpetual greenness of its grass, constantly refreshed by rains due to the S.W. Anti-trade wind. It is excellent for cattle, and would repay cultivation if only the land were properly drained and cared for: but the unsettled state of the country discourages such an investment.

(a) The Eastern half of Ulster prospers, but it really is not Ireland:

- (1) Its population is mainly of Scotch or English origin, introduced by James I; more thrifty by nature; Protestant by religion.
- (2) Its staple crop, flax, has led to the very important linen industry at Belfast, Lurgan, etc., where the water is particularly suitable for bleaching.
- (3) Iron (from county Armagh) and coal (from Ayrshire coal-field) combine to make Belfast a great shipbuilding port: also other manufactures. (Irish coal-mines are of little importance.)

In these respects it is peculiar; in others, it is normal: *e.g.* export of agricultural produce (potatoes, oats) from Londonderry, Belfast, Dundalk; scenery attracts tourists (Giant's Causeway); the physical features are lakes and scattered hills.

L. Neagh and R. Blackwater are continuations of the Rift valley of Scotland.

Mourne Mountains.

Belfast Lough, with Belfast ; Lough Foyle, with Londonderry, and Lough Swilly nearly cutting off Inishowen.

Belfast (population 380,000 ; nearly equal to Dublin) a great manufacturing town on Belfast Lough ; opposite the Ayrshire coal-field, with iron and flax in its "hinterland" ; shipbuilding ; ropes, linen (the water good for bleaching) ; distillery (as in most Irish towns).

(b) The ragged, rocky West Coast, exposed to Atlantic gales, with hills following the grain of the land (especially in S.W.).

Ulster Mountains, where home industries (*e.g.* Irish lace) are still carried on—L. Erne.

Donegal Bay ; Sligo Bay.

Connemara (marble) in S.E. of Connaught.

Galway Bay, Mouth of Shannon.

Parallel ranges of Kerry (*e.g.* Macgillicuddy's Reeks) and valleys invaded by the sea (*e.g.* Dingle Bay, with Valentia Island).

The Lakes of Killarney provide beautiful scenery.

(c) The part of Ireland S. of Dublin contains—

(1) The usual detached mountains ; *e.g.* Wicklow Mts., Slieve Bloom, Knockmealdown.

(2) The remarkably perfect graining in the S.W.

Rivers Bandon, Lee, Blackwater, Suir, with their estuaries.

Cork, harbour, on the Lee estuary, with Queenstown as port of call, exports eggs, butter, bacon.

(3) The "Golden Vale," a very fertile district near Tipperary, has Limerick for its port : grain, cattle, pigs, etc.

Limerick, on the Shannon, faces disadvantageously for trade.

(4) Leinster is fertile and less rainy : oats and barley.

(d) The Central Plain, low, flat, boggy (*e.g.* bog of Allen), is roughly 100 miles wide, by 50 from North to South : cattle, peat.

If Ireland is called a "basin," this would be the inside of the basin ; but its picturesque rim is very much broken. With better drainage, the Plain could be made very valuable land.

Rivers Liffey, Boyne, Shannon.

Dublin, in the old English Pale, opposite the busiest part of England, is the natural focus and entrance to Ireland.

∴ Capital, University, trade.

Manufactures "poplin" ; porter, whiskey.

Artificial harbour at Kingstown.

Chief Railway centre.

Communications are easy ∴ the mountains are not continuous.

The only real centres of population are in East Ulster, and on the coasts near Dublin and Cork. The railways are specially designed to serve these districts.

(1) Gt. N. (Ireland)—

Dublin—Drogheda—Dundalk—(Newry)—Portadown—Belfast.

Along coast.

—Londonderry.

(2) Dublin and S.E.—

Dublin—Wicklow—Wexford and Waterford.

(3) Gt. Southern and Western—

Dublin—Rosslare.

—Tipperary—Mallow—Cork.

By gaps in ridges.

—Killarney.

Along grain.

—Limerick.

(4) Midland Gt. Western—

Dublin—Mullingar—Sligo.

—Galway.

The interior lies so low, that rivers, lakes and bogs are plentiful ; and Canals are easily made.

(1) In industrial districts : L. Neagh is connected with Belfast, Newry (Newry canal to Carlingford Lough), and R. Shannon (R. Blackwater, Ulster canal, Shannon canal).

- (2) Dublin is connected with R. Shannon by Royal canal and Grand canal.
- (3) R. Shannon strings together a succession of Loughs (*e.g.* Ree, Derg); pierces hills at the gorge of Killaloe; passes Limerick.

Considerable trade with England in agricultural produce (cattle, butter, sheep, pigs, bacon, eggs).

Chief passenger lines are—

Stranraer—Larne (Belfast); Holyhead—Greenore or Kingstown (Dublin); Fishguard—Rosslare.

Other ports (Londonderry, Belfast, Waterford, Cork, Limerick) are important commercially.

QUESTIONS

1. Draw a rough map of the Thames basin, showing the principal surface features, railways, and towns.
2. How far is the relative importance of Glasgow and Edinburgh due to their geographical conditions?
3. Compare the general distribution of wheat and cattle in England: how can you account for the difference?
4. Explain what is meant by a Cyclone, a Rift Valley, a Maritime climate. Illustrate your answer (where possible) by diagrams and examples.
5. What are the chief coal-fields in England? What are the chief industries connected with each?
6. Give some explanation of the importance of London, Southampton, Inverness, Limerick, Derby, Carlisle, Manchester.
7. Describe one railway route from London to Edinburgh, mentioning the principal towns and physical features which it passes, and the main interests which it serves.

8. To what extent does Geography account for the distribution of populations in Scotland and Ireland ?

9. Compare the character of the towns on the coasts of Kent and Devonshire.

10. What explanation can you give of the difference between the climates of Surrey and the Hebrides ?

INDIA AND AUSTRALIA

INDIA

*References to pages in Lyde's "Commercial Geography of British Empire" (= L.), and
Herbertson's "Descriptive Geography of British Empire" (= D.).*

INDIA is roughly an equilateral triangle (sides 2000 miles) with an extra bit on the North. It naturally divides into four parts :—

- (1) An enormous mountain system in the North—Himalayas, etc.
- (2) A low alluvial plain—basins of Ganges and Indus.
- (3) A triangular plateau, the Deccan, with a rim of mountains (Western Ghats) on the West.
- (4) Burma, which belongs to India politically.

[*Monsoons* (Malayan word meaning "seasons") are seasonal winds which are more noticeable in S.E. Asia than elsewhere. They depend upon the fact that land is more sensitive to heat than water (*i. e.* water gets hot less readily, but retains its warmth longer).

∴ (1) In *hot* weather, land is heated and warms the air near its surface, making this air expand (*i. e.* become less dense, or less heavy)—but, sea being less affected by this heat, sea-air remains cooler (and ∴ denser) than land-air.

∴ there is a tendency for the heavier sea-air to flow in underneath the lighter land-air, to restore equilibrium in the air.

i. e. there is a tendency for wind to blow from sea to land.

If these conditions prevail for long enough, there will be a monsoon (seasonal wind) blowing inland.

(2) In *cold* weather, the conditions are reversed ∴ sea acts as a reservoir of warmth, which keeps the sea-air warm, while the land-air cools quicker. ∴ there will be a monsoon blowing seawards.

Monsoons are apt to disturb the normal action of Trade Winds and Westerlies wherever the sun's heat has exceptional power at certain seasons, *e. g.* in the case of a large land-mass near the Tropics—Monsoons are most pronounced where land slopes up from sea-coast to a high interior.]

Winds.—India lies almost entirely within Trade Wind latitudes (Calcutta practically on Tropic of Cancer); so that the normal wind should be the N.E. Trade Wind.

But the hot *summer* sun, heating the land more than the sea, causes high temperature and low pressure on the land especially about Sind.

∴ wind blows inland, with the usual right-handed swerve, and is known as the S.W. Monsoon in West India and Burma. There is a S.E. wind up the Ganges valley, which may be due partly to the low pressure system in N.W. India, partly to the opposition of the Himalayan mountain-barrier to the wind which blows up the Bay of Bengal.

In *winter*, the relative conditions are exactly reversed and the N.E. Monsoon prevails generally, but there is a N.W. wind down the Ganges valley.

N.E. Monsoon from November to February.

S.W. Monsoon from June to October.

Rainfall.—The N.E. Monsoon, coming from the colder Northern land, brings practically no rain, except on the S.E. coast and Ceylon, for which the Bay of Bengal supplies a little moisture—also the mountains of the N.W. are watered by storms about January.

The S.W. Monsoon, however, comes from a hot sea, and is fully charged with moisture, with which it deluges the Western Ghats and the Himalayas, and supplies a considerable rainfall to most of India: but the Indian Desert in Rajputana is almost rainless, and its Eastern border is liable to drought, as are parts of the Deccan immediately behind the Western Ghats (which condense the moisture from the wind).

Temperature.—Hot, especially in summer, because near the Equator. But many parts are of sufficient altitude to be cool even in summer ; *e.g.* Hill-stations, such as Simla, Darjiling, Poona : and the Sea has a moderating effect on the Coast.

Climate.—Great variety, owing to altitude and rainfall : but there are generally reckoned to be three seasons :—

- (1) Rainy season—June to October—S.W. Monsoon—heavy rains.
- (2) Cold weather—November to February—N.E. Monsoon—cool in the North, but rather hot in the South—sometimes called the “Retreating S.W. Monsoon.”
- (3) Hot weather—March to May—irregular winds—very hot.

* *Products*—mainly agricultural—peasants have small holdings and are practically vegetarians—the most populous districts are the fertile Ganges basin and the well-watered South-West.

(1) Agricultural :—

Grain.—Rice, wherever the land can be easily flooded—Lower Ganges valley, Sea-coast, Burma.

Wheat, requiring less moisture and heat—Upper Ganges valley, Punjab, Central Provinces.

Varieties of Pulses and Millets are grown everywhere, especially in Deccan.

Oil-seeds, *e.g.* sesame, linseed, castor-oil, are universal.

Opium (a poppy), Indigo and Sugar-cane in the Lower Ganges valley.

Cotton, on the basalt soils in Gujerat and Tapti basin, and in Upper Ganges valley—(The basalt is suitable because it holds moisture).

Jute on the Ganges-Brahmaputra Delta, where floods fertilize the soil.

Tea on sunny well-drained mountain slopes—Ceylon, Assam, Darjiling, Simla.

* These are collected here for purposes of comparison, to bring out the characteristic conditions of the various products.

- (2) Pastoral—cows needed for milk, horned cattle for all transport and field work : mainly bred in Rajputana, where the slight rainfall leaves necessary properties in the soil. Sheep and goats on dry hills, *e.g.* in Kashmir, producing wool and mohair.
- (3) Forests on wet hill-slopes, *e.g.* Western Ghats, E. Himalayas, Assam, Burma—jungles in many districts.
Teak in Burma, Assam, W. Ghats.
Sandal-wood, requiring heat, in Mysore.
Bamboos and Palms (*e.g.* coconut) in warm districts, especially in Ceylon and the S.W.
Mangoes provide excellent fruit.
- (4) Minerals of great variety, but little developed.
Coal, mostly of poor quality, is mined chiefly round Raniganj for use of Calcutta—production increasing with manufactures—some local iron.
Petroleum in basin of Irawadi.
Salt (essential, because they are vegetarians) is obtained by evaporation round coast, and mined in Salt Range (S. of Peshawar).

Wild animals are found in the jungles which have not yet been cleared by the rural population for agricultural purposes ; *e.g.* tiger, panther, jackal in Central India, Ganges Delta, and lower slopes of Himalayas. Elephants, found wild in the lower Himalayan forests, are used for lumber trade in Burma, and for State occasions elsewhere.

Population and Government.—"India" is a geographical expression for a portion of land which is cut off from the rest of Asia by a mountain barrier ; its inhabitants have no uniform characteristics in race, history, language, religion, caste, or government ; there is no national unity.

The population mainly consists of races which invaded the country through the Khyber Pass : *e.g.* Aryans, Scythians, Persians

(about 500 B.C.), Greeks (in 323 B.C.) who left little trace, Afghans (from the tenth century). The European conquest, arising out of Trade and participation in Native intrigue, dates from the eighteenth century. There are about seventy distinct varieties of language (*e.g.* Hindustani, Pali), of which many are local variations of one tongue. Brahminism is the indigenous religion; but the Mogul (Afghan) Empire led to a considerable spread of Moham-medanism (now 62,000,000), and the Europeans have introduced Christianity (now 3,000,000); in Burma and Ceylon the majority are Buddhists (a reformed Brahminism).

Caste is probably the most disintegrating factor; it has from earliest times stereotyped class distinctions in such a way that it is impossible for a man to change his social status: this checks ambition, and hinders migration of Labour.

Apart from two independent hill-states (Nepal, Bhutan) and some relics of French (*e.g.* Pondicherry) and Portuguese (*e.g.* Goa) possessions, every State is more or less subject to England: starting from three bases (Calcutta, Bombay, Madras), we gradually acquired the lands which lie on the Grand Trunk Road from Calcutta to Lahore, and on the sea-coast (thus cutting off French intrigue from Native States); also, we have gained considerable powers even in Native States. The Governor-General (commonly called Viceroy)—appointed for five years, advised by a Council—holds his court at Calcutta or Simla, subject in certain matters to the Home Government through the medium of the Secretary of State for India. Under the Viceroy are:—

- (1) Governors of Bombay and Madras.
- (2) Lieut.-Governors of Bengal, Eastern Bengal and Assam, United Provinces (Agra and Oudh), Punjab, Burma.
- (3) Chief Commissioner of Central Provinces, Agent to Governor-General in N.W. Frontier Provinces.

Under these are Commissioners, and other members of the Indian Civil Service.

Native States have their own Native rulers, whose power is limited in various ways—*e.g.* a British Resident sees that the government is just; war may not be declared without British sanction; British troops are quartered at Secunderabad, near to the Nizam's capital. The principal States are Hyderabad (pop. 12,000,000) and Mysore in the Deccan; Kashmir; smaller states in Rajputana and Central India, *e.g.* Jaipur, Gwalior.

Serious difficulties naturally arise out of the government of 300,000,000 people by a foreign nation whose residents number under 200,000: the prosperity of the country depends upon strong government, and any relaxation of our control which allowed free play to the many disruptive forces among the natives would at present merely restore the old state of intrigue and petty warfare.

(1) *Hill country of the North.* (D. 170.)

From the Pamirs, called "The Roof of the World," there branch the mountains which form the N. and N.W. boundaries of India.

Karakoram Range and parallel ridges of Himalayas with Mt. Everest (29,002 ft.) and Kanchanjanga (28,000 ft.).

Sulaiman Mts., pierced by the Khyber Pass to Kabul, and the Bolan Pass to Quetta.

The principal rivers of India rise among the parallel ridges of Himalayas; they become flooded torrents in summer, owing to melted snow and glaciers and the heavy rains of the S.W. Monsoon (800 ins. of rain have been known to fall in one year in Assam). These torrents, heavily charged with silt from the mountains, flood the plains, and fertilize and extend the Deltas.

Brahmaputra, rising in W. Tibet, reaches the sea through Assam and Bengal—navigable to near its most easterly bend.

Ganges, with Jumna and Gogra, rising near it and flowing S. of the mountains, helps it to form a huge Delta—magnificent waterways up to edge of mountains.

Indus and Sutlej, also rising in the same region, flow Westwards through gorges into the Punjab—joined by Jehlam, etc., and Kabul R.—useful for irrigation in Punjab—its variable course and sandbanks in lower reaches prevent navigation.

Assam—very mountainous—deluged with rain in rainy season—rice in the Brahmaputra valley, tea on the cleared slopes ; teak, etc., in the forests—capital, Shillong.

Nepal and Bhutan—independent hill people—admirable soldiers (Ghurkas).

Parts of Bengal, United Provinces, Punjab—forests, tea—hill stations, suitable for Europeans in summer, *e.g.* Darjiling, Simla (head-quarters of Viceroy).

Kashmir—native state among the mountains—barren except in valleys—sheep (wool), silk ; shawls—Srinagar, on R. Jehlam, very beautiful.

N.W. Frontier Province and part of Punjab—little rain—chiefly important as commanding the only gate into India (Khyber) ; garrisons at Peshawar, Rawal Pindi, Lahore, etc.

(2) *The Northern Plain.*

Aravalli Hills separate the Indus and Ganges basins in the South ; the whole is a fertile alluvial plain, well watered in the East, liable to drought in the centre, desert in the S.W., and needing irrigation in Punjab. Irrigation works are being rapidly extended, *e.g.* using the flood-waters of the rivers by means of canals (*D.* 176), and the underground water by means of wells in Ganges valley.

(a) Basin of sacred Ganges (*D.* 177) includes Bengal, United Provinces of Agra and Oudh and parts of Punjab and Rajputana—much the most important part of India (cp. basin of R. St. Lawrence)—very densely populated and carefully cultivated ; agricultural villages, with a few big towns as trade and manufacturing centres—sugar-cane (cp. Egypt), cotton (cp. U.S.A.), opium, indigo ; rice on the lower plains, wheat on the upper (cp. Mississippi valley)—Ganges, Jumna, Gogra.

In **Bengal**, Calcutta (population 1,000,000), capital of India (*D.* 183)—on the Hugli—a dangerous port when the tidal bore meets the swift current, but in spite of this valuable to its rich hinterland—increasing manufactures of paper and jute, with coal from Raniganj.

Patna prepares opium, a Government monopoly.

In **United Provinces**, Benares (*D.* 180)—most sacred to Hindus—temples, burning ghats, sacred cows, fakirs—brasswork.

Allahabad, capital—sacred junction of Ganges and Jumna, ∴ pilgrimage—railway junction for lines from Bombay and Lahore—famous market.

Lucknow (former capital) and Cawnpore (railway junction)—respectively famous for defence of Residency and massacre by Nana Sahib.

Agra and Delhi (in Punjab)—natural centres for a land empire in India—chosen by Moguls (1526–1707) for their capitals—adorned with marble palaces, Taj Mahal (Agra), Mosques, etc.—now commercial centres at important railway junctions—Delhi, with its neighbour Meerut, was prominent in the Mutiny.

In **Rajputana**, Jaipur and Gwalior are leading Native States (populations about 2 millions)—their rulers appreciate European civilization—museums, railways, etc.—also contains the Thar, in Indus basin (*D.* 185).

(*b*) The Western half of the Plain consists of the Basin of R. Indus, and the Thar (or Indian Desert). There is not much rain, except on the Himalayas.

The **Punjab** (=land of five rivers) is watered by the Indus and its tributaries (*e.g.* R. Sutlej, Jehlam, Kabul), which fill canals in their summer flood; with irrigation, much wheat is produced in a few districts, and exported *viâ* Karachi and Bombay.

Lahore, capital—railway and military centre in a fertile district.

Amritsar, centre of Sikh religion (a sect of Brahminism).

Sind is a dry land, through which the Indus reaches the sea.

Karachi, its most prosperous town, exports Punjab wheat—situated away from Indus Delta, because of annual floods and malaria.

(3) *The Deccan.*

The Western Ghats (=steps), about 6000 feet high, rising abruptly from the W. coast, bound a plateau which slopes downwards towards the East and ends in the less-defined Eastern Ghats (under 5000 ft.): in the South, they rise to 8000 ft. in the Nilgiri Hills. This plateau has been worn down in the basins of the Mahanadi, Godaveri, Kistna, flowing East, and of the Tapti and Narbada, which cut off the Satpura and Vindhya Ranges. The Cardamom Hills, running down to C. Comorin, are cut off by the Palghat Gap.

The West coast is well watered by the S.W. Monsoon, which loses most of its moisture in crossing the W. Ghats, so that the interior is liable to drought and famine. The East coast gets a more moderate supply of rain from the N.E. Monsoon, but much water is stored in huge "tanks," or taken by canals from the rivers, which are flooded during the rains, though at other times nearly dry.

The altitude of the interior prevents it from becoming so unpleasantly hot as the coastal plain.

Rice on coastal plain; wheat in upper valleys of R. Narbada and

Tapti; pulse and millet elsewhere. Oilseeds in many parts.

Cotton on the black earth districts of Gujerat, Tapti R., Berar,

Nagpur. Tobacco in Gujerat and other parts.

Forests in the W. Ghats; with coffee on the slopes. Palms and bamboos in the South.

Province of **Bombay** contains—

Bombay, on an island, with bridge to mainland—only good harbour—trade and political centre—cotton manufacture and export—government retires to Poona in rainy season. Surat has lost its importance owing to silting up of the river-mouth. The Rann of Cutch is too shallow for ships.

Berar provides Amraoti with trade in cotton, oilseeds, and wheat.

Central Provinces contain mountains, valleys, forests, jungle, etc.

Nagpur (cotton) and Jabalpur (wheat) are principal towns.

Madras, watered by N.E. Monsoon on E. and S.W. Monsoon on W., has a region liable to drought in the centre—thickly populated, especially in S.W. Monsoon area—Palghat Gap (a pass about 1000 feet high between mountains nearly 9000 feet) is the only easy pass through Western Ghats; used by railway to Madras from productive S.W. coast.

Madras, capital—open roadstead, only used \because there is no harbour near—chiefly a literary and professional centre.

Tanjore and Trichinopoly are trading centres.

Tuticorin, a port for Ceylon.

Utacamand, on the Nilgiri hills, is the summer station.

Hyderabad and **Mysore** are Native States, with capitals of same name. Bangalore is the chief British centre in Mysore—diamonds and coal are found in Hyderabad, gold in Mysore.

(4) **Burma** is well watered by the rains of the S.W. Monsoon: its mountains are therefore covered with forests (a very large export of teak—*D.* 199), and rice (also exported) is grown in the Irawadi valley and on the coastal plain (*D.* 198)—some valuable minerals, *e.g.* petroleum in Irawadi basin; also rubies, jade, etc. in Upper Burma. The Irawadi is principal means of transport between Mandalay (capital) and Rangoon (chief port). The inhabitants are Buddhists.

Communications.—In former times, towns sprang up in places which were valuable as land-fortresses, or centres of land-empires; *e.g.* Gwalior on a high rock, Delhi protected by river in central position at N.W. entrance to prosperous Ganges basin. There was little thought about the sea. Now, their conquerors, having arrived by sea, carry on their trade by sea, and have created new towns for this purpose, *e.g.* Bombay, Calcutta, Madras. The vast majority of the population is still agricultural, living in villages.

- (a) Fine roads, *e.g.* Grand Trunk Road, leading up the Ganges, through the most valuable part of India, to the ancient entrance in the N.W.

- (b) Rivers of the Northern plain.

Ganges, etc., provides transport, irrigation, fertile deposit (cp. Nile).

Brahmaputra—navigable up to Himalayas—fertilizes its Delta.

Indus, etc.—useful for irrigation—shifting sandbanks make navigation difficult.

Rivers of the Deccan are useful for irrigation, but too variable in volume for navigation.

- (c) Railways commonest in densely-populated Ganges basin—their routes elsewhere use river valleys or coastal plain to avoid mountains—important (1) to connect ports and inland towns—trade.

(2) for strategic purposes, in case of invasion from N.W., or local mutinies.

(3) to carry food to famine districts: *e.g.* the land behind the W. Ghats, and the eastern border of the Thar.

Peshawar—Lahore—Delhi—Agra—Allahabad—Calcutta.

Lahore to Karachi (Indus plain).

Bombay to Delhi *via* Baroda (West of plateau) and Jaipur.

to Allahabad (for Calcutta) *via* Jabalpur (by R. Tapti, Narbada).

to Calcutta *via* Nagpur (shorter, but more hilly).

to Madras (across plateau) *via* Poona and basin of R. Kistna.

Calcutta—Madras (by coast)—Tuticorin.

—Calicut (by Palghat Gap).

CEYLON

Ceylon—a Crown Colony—half the size of England—fertile and beautiful—a low coastal plain, rising to Pedrotalagalla (8000 ft.) in the centre.

Monsoons (*D.* 205) as in India ; but both bring rain, which is often stored in “tanks.” Under a hot sun, this produces most luxuriant vegetation, so that some thought it the site of Garden of Eden ; *e.g.* Adam’s Peak, Adam’s Bridge (a coral reef which blocks Palk Straits).

Palms of all kinds ; *e.g.* coconut, which provides food (fruit), fibre (leaves and fruit), oils (fruit), wood, thatch (leaves), etc. Bamboos, bananas, orchids, etc.

Tea is chief product, on slopes of hills ; and rubber in plantations on the plains.

Coffee and cinchona (quinine) used to be cultivated, but have been ruined by disease.

Pearl-oysters are found in Northern seas ; rubies and sapphires are found in mines.

Railways join Colombo to Newara-Eliya (the hill station) *via* Kandy, and to Trincomalee.

Kandy—a beautiful tea-centre on the mountain slopes.

Colombo (*D.* 204)—capital—the “Clapham Junction of the East”—port of call for ships from the West to China and Japan, Calcutta, Australia—chief port of island, though artificial.

Trincomalee, a fine natural harbour—head-quarters of British fleet, but ill placed for trade.

STRAITS SETTLEMENTS, ETC.

Straits Settlements and other neighbouring possessions in the tropics are hot, though excessive heat is moderated by influence of sea—mountainous (*e. g.* mountain backbone of Malay Peninsula)—plentiful rainfall—tropical forests, producing rubber, coconut palm, bamboo—other tropical produce under cultivation; cocoa, coffee, rice, pepper, spices.

Straits Settlements include Singapore, Malacca, Penang (island)—also various Protectorates on Malay Peninsula—famous for tin mined in mountain-backbone (especially in Perak).—Singapore, on an island, is a great port for all Eastern trade; especially for **Hong-Kong**, a valuable base for trade with China, Japan, and other Pacific countries.

The North of **Borneo** including Sarawak is British—similar tropical products.

The S.E. of **New Guinea** is also suitable for most tropical products—little developed.

AUSTRALIA

AUSTRALIA is an enormous island, with few indentations (equal to $2\frac{1}{2}$ Indias, or 24 times the British Isles); the highest land is, generally, near the coast, so that the interior is a region of inland drainage, cut off from the moderating influence of the sea.

- (1) A series of mountains runs from C. York to Victoria, not far from the E. coast; this may be called the Dividing Range or Cordillera; but it is irregular and has many local names—Darling Downs (a rolling plateau), Blue Mountains, Australian Alps (Mt. Townsend 7250 ft.).

The Great Barrier Reef (coral) runs parallel to this off N.E. coast, and obstructs navigation—1200 miles long.

- (2) The Western half is a low desert plateau rising towards the West (Darling Range 3000 ft., Hammersley Range 4000 ft.), with various detached ranges in the interior.
- (3) A low plain between these districts, with Flinders Range in the South.

Winds and Rainfall.—Australia extends from latitude 10° to 40° S., \therefore it is mainly in the Trade Wind area, and we should expect S.E. wind; this is charged with moisture from the Pacific, and should bring rain to the East of the Dividing Range.

The extreme South of Victoria and of W. Australia is in the Westerlies area, which should bring rain from the West.

These general conditions are modified by—

- (1) the great heat of interior plateau in the hot weather (January), which causes Monsoon winds to blow inland, over the N. and N.E. coasts;

- (2) the Northward displacement in our summer (their cold weather) of the whole system of Trades and Westerlies, when the belt of greatest heat is considerably North of the Equator, and the boundaries between Trades and Westerlies shifts further North, and a greater area in Australia is affected by the Westerlies (cp. Cape Colony).

The most rainy parts of the Colony are therefore—

- (a) North coast, down to 20° S. lat. ; gets plenty of rain (over 25"), mostly in the hot season when the Monsoon is blowing.
- (b) East coast, exposed to the S.E. Trade Wind ; gets a heavy rainfall, especially in the hot season, on the East side of the mountains ; but these prevent much moisture from reaching the interior.
- (c) S.E. corner gets rain from the Westerlies, mainly in winter.
- (d) S.W. corner gets rain from the Westerlies, which affect a larger district in cold season.

Hence most of the interior is liable to serious drought, relieved by occasional thunderstorms, and this lack of moisture accentuates the great heat in January and comparative cold in July.

Rivers and irrigation systems.

- (1) On seaward slopes of mountains—short mountain torrents, liable to flood ; sometimes nearly dry.
- (2) Area of inland drainage—rivers dependent upon rains ; normally a succession of water-holes, which are connected by a stream only after a storm—*e.g.* Cooper's Creek, which only occasionally flows as far as L. Eyre. L. Torrens is a continuation of the rift valley which contains Spencer Gulf.
- (3) S.E. corner—R. Murray, sometimes fed by snows of Australian Alps, has a fairly constant flow, and is of some use for navigation : its estuary is useless, being blocked by a sand-bar—its Northern tributaries (Darling, Lachlan, Murrumbidgee) are very variable in volume, dependent on the rains.

- (4) Artesian wells provide water for watering stock (*e. g.* on stock-routes to the coast) in the large artesian basin North and East of L. Eyre up to G. of Carpentaria and the Dividing Range.
- (5) Irrigation is becoming important in certain areas, especially North Victoria and on R. Murrumbidgee (Barren Jack dam is being made near Yass, and will be bigger than Assuan dam).

Hence, generally, the following generalizations are true :—

- (a) The Coastal strip is cultivated in the Eastern half of the Continent and in the S.W., where the rainfall is sufficient. Its products, chiefly cereals and fruits, vary with the Temperature; cattle flourish on wet coastal plain, especially in N.E.
- (b) Mountain slopes and river-courses, where there is sufficient moisture (*i. e.* not in the interior), would naturally produce forests (eucalyptus, pine, cedar, etc.—*D.* 79). In some places these have been cleared; in others they lead to a considerable lumber trade.
- (c) Inside the mountain rim, especially in the Eastern half, there is still sufficient moisture to provide some kind of pasture. Cattle (feeding with their tongue rather than teeth) need more moisture and longer grass than sheep (*L.* 109), and are found near river-courses. Sheep (wanting 10 to 20 inches of rain) can feed on salt-bush, a fleshy plant which stores up moisture in itself. Pastoral products are mainly exported (wool £22,900,000; butter, hides, mutton, etc.). Wheat needs 20 to 27 inches of rain, which it receives on inner slopes of Dividing Range (export averages £5,000,000).
- (d) The interior is, in places, a nearly rainless desert—Great Sandy Desert, Great Victoria Desert.
- (e) The Mountain-regions are mainly responsible for another source of wealth; the mineral output in 1907 was valued at £28,000,000, of which nearly half was gold from Western Australia, Victoria, and Queensland.

In treating the Continent according to its political divisions, it

must be remembered that the above characteristics (*D.* 98) apply to each State, and control the products, occupations, industries, and distribution of population.

Densest population and chief towns on the sea-coast, occupied with trade and government, with railways running inland. Exports of raw materials (especially wool and minerals) pay for imports of manufactured articles (especially clothing and machinery): in newly-developed and sparsely-populated countries, this is a more economical system than the development of local manufactures (cp. Canada, New Zealand); but manufactures are increasing in Victoria and N.S.W.

Mining centres in the mining districts, which are generally where the strata have been disturbed by upheaval.

Small agricultural centres in the farming districts, especially on railways.

Queensland.—Tropical products near the Coast, especially sugar-cane (*D.* 104) and fruits (*e.g.* banana, orange, pineapple)—“coloured” labour is forbidden by law.

Townsville, port for tropical products of the North; gold from Charters Towers—shut in by Great Barrier Reef.

Rockhampton, port for pastoral produce (*D.* 110) of interior, especially wool; gold from Mount Morgan (very rich).

Brisbane, capital, with fine buildings and institutions; port for fertile Darling Downs (dairy produce, wheat, wool, etc.—*D.* 105) and Ipswich (coal and manufactures).

New South Wales.—Chief wool-producer; climate of Western slopes suitable for Merino sheep, introduced from Spain—rabbits, introduced from England, cause great loss by eating grass—wheat on inner slopes of mountains.

Newcastle, greatest coal-centre in Southern hemisphere—produce valued at £3,300,000 in 1908.

Sydney (580,000 population), capital, much the biggest town in the State—large, safe, and beautiful harbour on Port

Jackson (*D.* 91); receives mail steamers from Europe; chief port for pastoral produce of North and West Riverina district (railway zigzags through Blue Mountains by very difficult route)—Parramatta is famed for oranges and lemons.

Broken Hill and Silverton, in the West, produce much silver.

Victoria.—The best-watered State, and therefore most densely populated—cattle-breeding in Gippsland, wool of best quality (*D.* 86) in South-west, wheat and vines (cp. Mediterranean countries, Cape Colony) in Wimmera district—gold discovered in mountains in 1851.

Melbourne (540,000 population), capital of the State and temporarily of the Commonwealth—magnificent harbour on Port Phillip, doing much trade—exports from S.E. Riverina.

Geelong, also on Port Phillip, has woollen manufactures.

Ballarat and Bendigo are on important gold-mines in the mountains.

South Australia, including Northern Territory—mainly too dry for cultivation (*D.* 115); but important for wheat (*D.* 114) and vines (*L.* 112) on S.E. coast (cp. Victoria)—tropical produce in Northern Territory; but it is very hot for white settlers.

Adelaide, capital, stands on a plateau, connected with Port Adelaide on Gulf of St. Vincent.

Port Pirie is connected with Broken Hill silver-mine—also exports wheat.

Palmerston, capital of Northern Territory, stands above Port Darwin—connected with Adelaide by a telegraph line.

River Murray has its estuary blocked by a shingle bar, which handicaps commerce; and the Great Australian Bight is bordered by cliffs generally 500 feet high.

Western Australia—mainly desert except in the S.W. corner and round the coast—rich gold-fields (*D.* 120) lie 500 miles inland—forests of Jarrah and Karri trees in wet S.W. corner—pearl (oyster) fisheries around the N.W. coast.

Albany is a good port on King George's Sound.

Perth, capital, connected with its port Fremantle—in fertile district.

Coolgardie and Kalgurlie are the chief gold-centres.

Geraldton, an agricultural centre, and port for Cue goldfields.

Tasmania—a mountainous island, cut off by Bass Strait—in region of Westerly winds, ∴ rain on Western slopes with forests of eucalyptus, etc.—sheep and cattle in the drier East—fruit in South—minerals (copper, silver, gold).

Hobart, capital, makes jam.

The following figures, being rough approximations derived from most recent statistics, will make possible a comparison between the States :—

	Queensland.	N.S.W.	Victoria.	S. Australia.	W. Australia.	Tasmania.	New Zealand.
Area (in thousands of sq. miles)	670	300	90	900	975	26	105
Population in thousands in 1908.	552	1592	1271	407	267	186	973
Density of population per sq. mile (approximately) . . . }	1	5	14	·4	·3	7	9
Gold production in million £ } (annual average 1901-8) . . }	2·4	1·0	3·1	·1	7·8	·3	2
Sheep in millions (in 1908) . .	18·3	43·3	12·5	6·9	4·1	1·7	22·4
Cattle in millions (in 1908) . .	4·3	3·0	1·6	·7	·7	·2	1·7
Wheat (product in million } bushels in 1908) }	1·2	15·4	23·3	19·3	2·5	·7	8·8
"Greasy" wool (in million lb. } in 1908) }	115	345	94	52	22	14	167
Total value £23,200,000 in Australia.							

Railways have been built to connect the principal centres of population, and to convey the produce of the interior to ports; but the variation of gauge in different States makes through traffic impossible.

A line runs from Brisbane, along high ground, to Newcastle and Sydney; South of the Blue Mountains to Melbourne *via* Albury; on to Adelaide, and thence Northwards.

A line joins Geraldton, Perth, Albany.

Other lines run inland from Townsville, Rockhampton, Brisbane, Sydney, Melbourne, Port Pirie, Perth, Geraldton.

The Government are now considering proposals for opening up more of the country by building trans-continental railways.

Many *Animals* and *Trees* are peculiar to Australia, showing a very ancient separation from Asia; they have adapted themselves to the special conditions of Australia; *e.g.* the great heat and dryness of the Interior.

e.g. Marsupials, adapted to a land of drought because they are capable of carrying their young in a pouch—kangaroo, wombat, phalanger.

Emu, cassowary, paroquet, lyre-bird, black swan.

Crocodile, lizard, tortoise.

White ant, whistling spider.

Pearl-oyster industry is important in the shallow warm waters round the Northern coasts (*cp.* Ceylon).

The trees are capable of withstanding great heat of the sun, having foliage with a leathery surface, or such as to turn away from the sun's rays.

e.g. Myrtle, acacia, conifers.

Eucalyptus, of which some are over 400 feet high—oil is a product—the harder varieties are very valuable, *e.g.* for railway-sleepers, especially those which defy the white ant (*e.g.* Jarrah is exported from the S.W.; also Karri, which is even harder).

Government.—The Commonwealth of Australia, a self-governing colony, consists of six States, under a Governor-General (representing the King of England) and Executive Council ; with Senate and House of Representatives, who legislate about federal commerce, finance, defence, postal service, etc. Federal capital is being built near Yass, S.W. of Goulburn, in N.S.W.

Each State has its own Governor and Legislative Council and Assembly, to conduct more local matters.

The record of discovery is preserved in local names : de Torres, Tasman, and other Dutchmen preceded Captain Cook, who explored the East coast in 1770. The use of the Sydney district as a convict station from 1788 to 1839 discouraged free colonists ; but the discovery of gold, in New South Wales and Victoria, proved a great attraction (population of Victoria increased from 78,000 in 1851 to 400,000 in 1856). Exploration continued, and the colony made such progress that it was proclaimed a Commonwealth in 1901. Few Aborigines remain.

Many difficult problems await a solution ; *e.g.* there is a conflict between Parties as to immigration, land, and labour questions.

NEW ZEALAND

THE Dominion of New Zealand—proclaimed in 1907—ruled by a Governor and Assembly of two Houses—explored by Captain Cook in 1769; annexed by England in 1840, after wars with native Maoris.

Consists of North Island and South Island (separated by Cook Strait) and other smaller islands—about 1200 miles from Australia.

Mountains run in parallel ridges from S.W. to N.E.

In S. Island—Southern Alps (Mt. Cook 12,350 ft.) near the West coast, with perpetual snow, glaciers, etc.; rocky coast, with fiords in South-West (cp. Scotland, Norway).

In N. Island—Ranges continue, lower, running out to E. Cape. Volcanic district on their West, with Mt. Egmont (extinct), Mt. Ruapehu (active), geysers, sulphur springs, etc. (D. 68).

Winds and Rainfall—about Latitude 40° South, ∴ in the “Roaring Forties” (L. 20) with Westerly winds—N.W. wind brings rain from the open sea, which is warmed by the East Australian current.

∴ Rainfall is heavy on the West of mountains, plentiful on the East.

∴ many rivers, fed by rains and reservoirs of snow; liable to flood; not much use for navigation except R. Waikato, flowing through L. Taupo.

Climate is “maritime,” because of the open sea; no extremes of heat or cold—warmer than England because nearer to Equator—famed for its healthiness.

Products.—Forests of evergreens (pines, etc.) on the well-watered Western slopes and river-valleys.

Sheep and cattle flourish on the rich grass plains on the East of South Island and round the coast of North Island. Also horses, especially in S.E. Exports to the United Kingdom in 1907 were valued at—wool $7\frac{1}{2}$ million pounds, frozen meat $3\frac{1}{2}$ (mainly mutton), butter 2.

Minerals.—Coal and gold in several places.

Manufactures of local products, especially food-stuffs and wool are important ; other manufactures are beginning to develop.

South Island.—Population is mainly on the Agricultural land on the East, with railway near the coast.

Christchurch, with its port Lyttelton, deals with most of the produce of the fertile Canterbury Plains (*D.* 75).

Dunedin has manufactures, owing to neighbouring coal.

North Island.—Volcanic region is a resort for tourists and invalids—Kauri gum (*D.* 70) is mined in the North—Railway joins Wellington and Auckland.

Wellington, capital, the chief port in the Dominion.

Auckland has a harbour on both coasts.

APPENDIX

IMPERIAL TRADE ROUTES

Prosperity of British Empire depends largely on its Trade, whose safety depends on the Navy—Trade-routes and coaling-stations are of great Imperial importance. It is convenient to consider the routes as starting from Great Britain, whose chief ports (with tonnage, in millions, cleared in 1908) are—

London	19·7	Greatest port in World.
Cardiff	14·9	Chief coal port (14 million tons) in World.
Liverpool	14·9	Greatest cotton port in World.
Tyne ports	12·5	Coal export to Continent.
(No other British Port clears more than 8 millions.)		

- (1) *Eastern Trade, viâ Suez Canal to India, Malay Peninsula, China, Japan.*
Australia, New Zealand.
East Africa.

Our control over this route is secured by a few isolated possessions, which have not been included in a geographical treatment of our great colonies.

Gibraltar—key to W. entrance of Mediterranean Sea—very powerful rock-fortress, naval depôt, and coaling-station—taken from Spain in 1704.

Malta—key to the “waist” of Mediterranean—capital, Valetta.

(Suez Canal—British ships have 4 times the tonnage of other nations.)

Aden—key to Red Sea—strongly-fortified coaling-station, in an extinct volcanic crater which the sea has invaded—both Aden and Colombo are great trade-junctions; Karachi, Bombay, Calcutta, Rangoon, Singapore are other chief ports and coaling-stations.

Hong-Kong—focus of trade with China and Japan—very important in view of coming development of Pacific lands—ceded by China in 1842.

In Australia, the ports are, in order of tonnage cleared, Sydney (6 millions), Melbourne (5), Newcastle, Port Adelaide, Brisbane;

In New Zealand, Wellington (3), Lyttelton (2), Auckland.

- (2) *Southern Trade*, by the South Atlantic Ocean—Gibraltar, Sierra Leone (Freetown), and S. African ports (Cape Town, Simon's Bay, Port Elizabeth, East London, Durban) are mentioned elsewhere; Lisbon, Madeira, and St. Vincent, belonging to our ally Portugal, are likely to be available even in time of war—if Suez Canal were blocked, our route to India and Australasia would be round the Cape of Good Hope.

St. Helena—a fortified island in S. Atlantic.

Mauritius—a fortified stepping-stone in S. Indian Ocean.

- (3) *Western Trade*, across N. Atlantic Ocean.

(a) to Jamaica and other W. Indies.

(b) to Canadian ports; Montreal (closed for 5 winter months), Halifax, St. John; possibly Port Churchill will be used in 4 summer months—inland waterways up to Port Arthur—C.P.R. and other railways.

Trade also across Pacific Ocean from Vancouver to Australasia and Asia.

IMPERIAL INDUSTRY AND COMMERCE

(Not too much trust must be placed in the figures given below ; they are only intended as a rough guide to the relative importance of different articles and trades. They are based on the most recent available figures, chiefly for 1908 ; in cases of varying values, a rough estimate is given. Figures in black type indicate millions of £ ; those in italics millions of the unit named.)

The Imperial theory suggests that Great Britain is the densely-peopled Workshop, which the Colonies should supply with raw material and food ; but at present, majority of our supplies comes from foreign lands, and Colonies are developing manufactures.

Coal is the chief basis of modern industry—production in United Kingdom (267 tons) in 1907 was only exceeded by U.S.A. (429) ; Germany produced 141. Colonies will develop their coal-mines when manufactures increase. (See p. 23.)

Of manufactures of United Kingdom, **textiles** are much the most important, supplying half the value (127) of all exports—value of cotton manufactures is double the wool, and five times the linen. The chief supplies of raw material are—

Cotton U.S.A. (40), Egypt (14), India (2).

Wool United Kingdom (4), Australia (12), New Zealand (5), South Africa (2½).

Metal-work is next in importance—exports of iron and steel goods are valued at 40, machinery at 30. Our chief sources of iron are United Kingdom (4), Spain (3½), other countries (3½).

Supply of food for United Kingdom depends mainly on “new” countries, where land is cheap and productive, and population relatively small. The following table shows some of our imports :—

Land of Production.	Cwts. of Wheat in 1909.	Meat.	Dairy.
India	15		
Australia	10	2	2
New Zealand		3	
Canada	17		5
Total import	98	41	38
U.S.A.	15	12	
Argentina	20	9	5
	Russia 17 U.S.A. flour 6		Denmark 13 Holland 4

The following table is useful as showing the relative importance of various products and occupations.

	United Kingdom.	India.	Australia.	New Zealand.	Canada.	S. Africa.	U.S.A.
Number of sheep	31	18	90	23	3	29	56
Number of cattle	12	90	11	2	7	3	71
Number of horses	2	1	2	4	2	5	20
Annual coal output in tons .	262	12	9	2	9	5	429
Annual gold output		2	13	2	2	32	19
Wheat crop (bushels)	60	300	80	7	140	3	700
Oat crop (bushels)	178		15	15	300	4	900

QUESTIONS

1. Give some account of the Climate, Surface-configuration, and Products of Ceylon.
2. What is meant by a Monsoon? How can its action be explained?
3. Compare the positions and importance of Calcutta and Delhi, Bombay and Poona, Port Pirie and Silverton, Trincomalee and Colombo.
4. Where would you expect to find rice, eucalyptus, tea, white ants, rubber, vines, gold, caste, bananas?
5. What are the chief hindrances to agriculture in (a) India, (b) Australia? How far are they similar?
6. Compare the mountain systems of India and Australia; in what ways are they an advantage or disadvantage?
7. What parts of India are most densely populated? Why? What occupies the population in these parts?
8. What do you know about Peshawar, Auckland, Newcastle, Madras? How far are they fitted to perform their functions?
9. Compare the climate and occupations of Coolgardie and Sydney.
10. What difficulties are there about communications in Australia? Why is the question important?
11. Give some account of the manufactures in Australia and New Zealand, explaining any peculiarities.
12. Why is the population of Australia, generally speaking, concentrated in the most rainy districts, but in New Zealand in the least rainy?
13. Draw maps of (a) Ganges basin, (b) Murray basin, showing mountains, chief towns and products, political divisions.
14. How is Australia governed? What are the chief problems of its government?

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